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Cover: Male Northern Bobwhite (*Colinus virginianus*) on the restored grassland on Washington College's River and Field Campus (formerly Chino Farms), Queen Anne's County, Maryland. Photographed by Daniel M. Small on 24 May 2016.

Maryland Birdlife 68(1):1–2

Editor's Note

Welcome to the spring 2019 issue of *Maryland Birdlife*. This issue documents three Maryland firsts: Sharp-tailed Sandpiper (*Calidris acuminata*), Crested Caracara (*Caracara cheriway*), and Shiny Cowbird (*Molothrus bonariensis*). Additionally, the issue features in-depth articles on the recovery of an Eastern Shore population of Northern Bobwhites (*Colinus virginianus*), nesting success of central Chesapeake Bay Ospreys (*Pandion haliaetus*), and mortalities of Maryland Bald Eagle (*Haliaeetus leucocephalus*). The results of the 2018 May Count and the 2018 Fall Count round out the issue.

First YMOS Submittal to *Maryland Birdlife*

This issue features the first article submitted by a member of the YMOS (Youth Maryland Ornithological Society). Joshua S. Heiser, a high school student, has documented Maryland's first record of Shiny Cowbird (*Molothrus bonariensis*) that showed up in his Montgomery County yard. We hope that Joshua's achievement encourages more YMOS members to submit manuscripts to the journal. Congratulations, Joshua!

Maryland Birdlife Is Now Archived on SORA and BHL

Back issues of *Maryland Birdlife* are now archived online at SORA (Searchable Ornithological Archive) and at BHL (Biodiversity Heritage Library). All issues (except for a holdback of the two most recent years) are accessible. The back issues can be accessed on SORA at https://sora.unm.edu/node/132691 and on BHL at https://www.biodiversitylibrary.org/bibliography/118626#/summary.

Introducing Ricki Norton: The New Statewide Compiler for the Maryland Mid-winter Bird Count

Ricki Norton's interest in nature started with her family taking her on frequent outdoor adventures as a kid. As she grew older, her interest in animals grew and led her to pursue a degree in Ecology and Evolutionary Biology at the University of Connecticut (UConn) in Storrs, Connecticut. During college, she was lucky enough to spend one summer in California participating in a Behavioral Biology Fellowship with the San Diego Zoo Institute for Conservation Research. It was during this time Ricki became more focused on birds, working on a project involving acoustic monitoring of Cactus Wrens (*Campylorhynchus brunneicapillus*) and the effects of increased ambient noise levels on bird communication. After graduating UConn in 2012, Ricki started to pursue a Masters in Biology at the College of William & Mary in Williamsburg, Virginia, where she planned to continue researching bird song and noise pollution. However, various personal factors caused her to leave school, and eventually led her into the veterinary field where she now works as a registered technician in a specialized neurology practice. Birdwatching and nature photography are now two of her main hobbies. Ricki's favorite Maryland birding spots include Violette's Lock and Riley's Lock (both Montgomery County) along the Chesapeake & Ohio Canal, Lake Artemesia (Prince George's County), Patuxent River Park (Prince George's County), and Blackwater National Wildlife Refuge (Dorchester County). She is excited to apply her prior education and current passion as the new volunteer Statewide Compiler for the Maryland Mid-winter Bird Count.

William H. (Bill) Thompson, III – In Memoriam

The birding community will sorely miss Bill Thompson, III, Editor and Publisher of *Bird Watcher's Digest*, who passed away on 25 March 2019 at age 57 from pancreatic cancer. I first met Bill in June 1990 at an American Birding Association Conference in Fort Collins, Colorado. Over the years, our paths crossed a few more times. Bill was always cheerful and personable. He was a standard bearer for birding, promoting the pastime any way that he could. Bill's memory and legacy will live on in the hearts and minds of his birding friends and acquaintances.

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Maryland Birdlife 68(1):3–8

First Record of Sharp-tailed Sandpiper (*Calidris acuminata*) in Maryland

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On 30 August 2017, I went to the Cox Creek Dredged Material Containment Facility (locally known as Swan Creek) in Anne Arundel County, Maryland, on my lunch break to look for shorebirds. Since the creation of the dredge ponds at Swan Creek, it has attracted thousands of shorebirds and hundreds of birders as one of the most easily accessible shorebirding locations in the Baltimore region. I made dozens of lunch break trips there in the spring, summer, and fall, while the site was open to visitors.

On this day, Swan Creek held a number of amazing birds that can be seen in my eBird checklist (Hafner 2017a), and included 8 Hudsonian Godwits (*Limosa haemastica*), 25 Stilt Sandpipers (*Calidris himantopus*), 6 White-rumped Sandpipers (*C. fuscicollis*), 1 Wilson's Phalarope (*Phalaropus tricolor*), and 4 Red-necked Phalaropes (*P. lobatus*). In fact, the numerous interesting species made it hard to focus on the intriguing looking bird that was moving around in front of me.

I first noticed the Sharp-tailed Sandpiper (*Calidris acuminata*) early in my hourlong stay, but the light was poor and the bird was distant. As I repeatedly scanned the shorebirds, my attention was continually drawn to this sandpiper with very worn feathers. I attempted a few digiscoped photos, but the poor lighting conditions made the photos less than ideal. Still, I sent the photos to Mikey Lutmerding and Marshall Iliff to see if they also thought the bird was interesting. Mikey responded almost immediately that it was interesting and to try for better photos.

At this point, I really needed to return to work, but Dan Haas and Ryan Johnson arrived to see the godwits and phalaropes that I had reported from the field. I told them to take a quick look at those, but that they should look at and try to photograph this unusual bird I thought might be a Sharp-tailed Sandpiper.

As I was driving back to work, Marshall Iliff responded to my text saying he thought my photos were good enough to confirm Sharp-tailed Sandpiper. When I got back to my computer, I immediately wrote a post to the Maryland & DC Birding Google Group (Hafner 2017c) and the Maryland Notable Bird Sightings and Discussion (Facebook) Group (Hafner 2017b) encouraging people to

photograph the bird. Over the next two days, over one hundred birders saw the bird and many wonderful photographs were taken conclusively documenting the identification (Figure 1). Many of the visitors were also treated to a Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*) which hung around the area for several days.

The Sharp-tailed Sandpiper stayed for at least three days, 30 August to 1 September 2017. Swan Creek then closed for the weekend. There were reports of the bird the following week, but no diagnostic photographs were obtained.

The Sharp-tailed Sandpiper was a medium-sized shorebird, similar in size and shape to the juvenile Pectoral Sandpipers (*Calidris melanotos*) also present (Figure 2). There were no noticeable differences in primary projection, bill length and shape, or leg color. The feathers on the bird were very worn, identifying it as an adult, which made it stand out among the fresh juvenile Pectorals. The cap was slightly redder and showed a more prominent supercilium than expected in an adult Pectoral. The chest streaking was similar to Pectoral with one significant difference. In Pectoral, the streaking is densest at the bottom center of the chest, many times creating the illusion of a dark spot there. In the Sharp-tailed, the densest streaking was on the sides and upper chest, and under close observation, did not have the sharp cutoff of streaks on the lower chest. The streaks then continued down the flanks, in more of a chevron shape, and on the undertail coverts. Some Pectoral Sandpipers could show light markings on the rear flanks, but none to the extent of the Sharp-tailed. The Sharp-tailed also showed pale golden tram lines down the back, similar to a juvenile Pectoral. This feature is not consistent on adult Sharp-tailed Sandpipers, but is not seen on any photos of adult Pectoral Sandpipers that I could find.

Swan Creek has a large dredged material containment area similar to projects at Hart-Miller and Poplar Islands in the Chesapeake Bay which have also attracted high numbers of shorebirds. The location opened to the public circa 2007 and has been regularly visited by birders for survey purposes for many years. In addition to high numbers of migrating shorebirds and waterfowl, rarities are regularly found at the site and have included: Tufted Duck (*Aythya fuligula*), Eared Grebe (*Podiceps nigricollis*), Black Rail (*Laterallus jamaicensis*), Long-billed Curlew (*Numenius americanus*), Gull-billed Tern (*Gelochelidon nilotica*), American White Pelican (*Pelecanus erythrorhynchos*), Swallow-tailed Kite (*Elanoides forficatus*), Snowy Owl (*Bubo scandiacus*), Cave Swallow (*Petrochelidon fulva*), Clay-colored Sparrow (*Spizella pallida*), and Lark Sparrow (*Chondestes grammacus*). As of 4 September 2018, the site has been temporarily closed to the public during the Cox Creek expansion project (Carney 2018). Regardless, the area will still be surveyed regularly and have occasional field trips, thereby continuing to produce new and exciting records for the region.

Figure 1. Adult Sharp-tailed Sandpiper (*Calidris acuminata*). Cox Creek Dredged Material Containment Facility, Anne Arundel County, Maryland. Photographed by Jared Fisher, 1 September 2017.

Figure 2. Adult Sharp-tailed Sandpiper (left) and a Pectoral Sandpiper (*Calidris melanotos*). The Sharp-tailed differs from the Pectoral by having a reddish cap, strong supercilium, dense upper chest streaking, and flank streaking. Cox Creek Dredged Material Containment Facility, Anne Arundel County, Maryland. Photographed by Linda Chittum, 1 September 2017.

REGIONAL STATUS SUMMARY

Sharp-tailed Sandpiper is an Asian shorebird that breeds in Siberia and primarily winters in Australia (O'Brien et al. 2006). It is relatively common in its native range with Birdlife International (2019) ranking the conservation status as a species of "Least Concern." Sharp-tailed Sandpiper is a regular and annual vagrant to the West Coast of the United States, but occasionally appears on the East Coast (O'Brien et al. 2006). East Coast records between Massachusetts and North Carolina (Table 1) are split between adults and juveniles in contrast with West Coast records, which are predominately juveniles (O'Brien et al. 2006). Most records are of fall migrants at areas with large congregations of shorebirds, with most adults appearing in August and most juveniles in September and October. These vagrants have been found in a variety of habitats ranging from beaches to mudflats to sod farms.

Table 1. Northeast and Mid-Atlantic Regional Records: Massachusetts to North Carolina. Records are ordered north-to-south by state and chronologically per state. (A = adult; J = juvenile)

State	Date	County	Age	Records Committee Acceptance Number	Citation
Massachusetts	30 JUN 1971	Plymouth	A	1971-02	MARC 2019
Massachusetts	3 NOV 1973	Essex	J	1973-04	MARC 2019
Massachusetts	3–9 OCT 2010	Barnstable	A	2010-35	MARC 2019
Connecticut	15–16 OCT 1985	Fairfield	J	86-9	ARCC 2018
Connecticut	11 AUG 1999	New Haven	A	99-34	ARCC 2018
New York	18–24 JUL 1981	Queens	A	1981-12	NYSARC 2018
New York	10–13 OCT 2002	Monroe	J	2002-38	NYSARC 2018
New York	3–4 AUG 2008	Queens	A	2008-43	NYSARC 2018
New York	23 SEP 2012	Monroe	J	2012-74	NYSARC 2018
New Jersey	8 OCT 2002	Cape May	J	2003-057	NJBRC 2017
New Jersey	3–5 SEP 2003	Cumberland	J	2004-073	NJBRC 2017
Delaware	8 AUG 1993	Kent	A	95/45	DBRC 2018
Delaware	5–6 AUG 2002	Kent	A	02/20	DBRC 2018
Maryland	30 AUG–1 SEP 2017	Anne Arundel	A	2017-045	MD/DCRC 2018
Virginia	14 SEP 1983	Fairfax	J		VARCOM 2013
Virginia	14–21 SEP 1984	Accomack	J		VARCOM 2013
Virginia	16 SEP 1989	Fairfax	J		VARCOM 2013
North Carolina	31 AUG 2009	Craven	J	09-12	LeGrand et al. 2011, 2018
North Carolina	15 OCT 2010	New Hanover	J	10-21	LeGrand et al. 2011, 2018

In 2009, many of Maryland's top birders voted on a "Next 10" list, attempting to guess the next species to be added to the state list. Sharp-tailed Sandpiper placed 7th on this list, likely due to Virginia and Delaware having multiple records. It

was the only shorebird to appear in the Top 10, well ahead of 20th place Bar-tailed Godwit (*Limosa lapponica*) (Hafner and Hubick 2009).

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I thank the Maryland Port Administration and Maryland Environmental Service for facilitating birder access to the Cox Creek Dredged Material Containment Facility and extending visitor hours during the bird's stay. I thank Tim Carney for his regular surveys of the facility which encouraged me to take long lunch breaks. I thank Dave Czaplak, Mikey Lutmerding, Marshall Iliff, and Clive Harris for thoughtful identification discussions of this bird. Thanks are extended to Jared Fisher and Linda Chittum for use of their photos for this article.

LITERATURE CITED

ARCC (Avian Records Committee of Connecticut). 2018. ARCC Reports Index of Species (Updated 25 March 2018). Available at: http://www.ctbirding.org/arcc/arcc-reports-index-of-species/. Accessed 28 January 2019.

Birdlife International. 2019. Data Zone: Sharp-tailed Sandpiper. Available at: http://datazone.birdlife.org/species/results?thrlev1=&thrlev2=&kw=Sharp-tailed+Sandpiper&fam=0&gen=0&spc=&cmn=&reg=0&cty=0. Accessed 29 March 2019.

Carney, T. 2018. **Swan Creek Is Closed to Birders -- Please Read** (posted 4 September 2018). Maryland & DC Birding Google Group. Available at: http://www.mdbirding.com/. Accessed 29 March 2019.

DBRC (Delaware Bird Records Committee). 2018. Delaware Bird Records Committee - Summary of Completed Reviews (Updated 1 September 2018). Available at: https://www.dosbirds.org/wp-content/uploads/2018/09/List-of-Ajudicated-Records.pdf. Accessed 28 January 2019.

Hafner, M. 2017a. eBird Checklist S38907843: Swan Creek Wetland--Cox Creek DMCF (access by guided tour only), Anne Arundel County, Maryland, US, Wed Aug 30, 2017 12:20 PM. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available at: https://ebird.org/view/checklist/S38907843. Accessed 28 March 2019.

Hafner, M. 2017b. Facebook Post. Maryland Notable Bird Sightings and Discussion Group. Available at: https://www.facebook.com/groups/MDRare BirdsDiscussionGroup/permalink/1251838651628673/. Accessed 29 March 2019.

Hafner, M. 2017c. Interesting *Calidris* at Swan Creek - possible Sharp-tailed (posted 8/30/2017). Maryland & DC Birding Google Group. Available at: http://www.mdbirding.com/. Accessed 29 March 2019.

Hafner, M., and B. Hubick. 2009. Maryland's Next 10 Bird Species. Available at: https://mdbirds.org/wp-content/uploads/2018/03/Marylands-Next-Ten-Bird-Species-2009.pdf. Accessed 28 March 2019.

LeGrand. 2018. Sharp-tailed Sandpiper. Birds of North Carolina: their Distribution and Abundance (last update 1 February 2018). Available at: http://ncbirds.carolinabirdclub.org/accounts.php. Accessed 28 January 2019.

LeGrand, H.E., Jr., K.E. Camburn, S. Cooper, R.J. Davis, E.V. Dean, W.K. Forsythe, J.S. Pippen, M.H. Tove, and R.S. Tyndall. 2011. 2010 Annual Report of the North Carolina Bird Records Committee. *The Chat* 75(1):1–2.

MARC (Massachusetts Avian Records Committee). 2019. Database (Updated March 2019). Available at: maavianrecords.com/database/. Accessed 29 March 2019.

MD/DCRC (Maryland District of Columbia Records Committee). 2018. MD/DCRC Database Abridged Version: Maryland, 21 June 2018. Maryland Ornithological Society. 172 pp. Available at: https://mdbirds.org/wp-content/uploads/2018/06/mddatabase.pdf. Accessed 28 March 2019.

NJBRC (New Jersey Bird Records Committee). 2017. New Jersey Bird Records Committee List of Accepted Records of Rare Birds in New Jersey through December 2016 (ninth corrected and revised edition December 2017). Available at: http: http://njbrc.com/documents/ARL.pdf. Accessed 28 January 2019.

NYSARC (New York State Avian Records Committee). 2018. NYSARC Reports and Decisions through 2013 (updated 26 July 2018). Available at: https://nybirds.org/NYSARC/HistData/NYSARCthru2013updated2018_0726.pdf. Accessed 29 March 2019.

O'Brien, M., R. Crossley, and K. Karlson. 2006. *The Shorebird Guide*. Houghton Mifflin Company, Boston, MA, and New York, NY. 477 pp.

VARCOM (Virginia Avian Records Committee). 2013. Sharp-tailed Sandpiper. Database for Ornithological Verification and Submission (DOVES). Available at: http://vsodoves.org/submissions?utf8=%E2%9C%93&field=common_name&search=Sharp-tailed+Sandpiper&status%5B%5D=accepted&status%5B%5D=pending&status%5B%5D=new&status%5B%5D=incomplete&status%5B%5D=rejected&status%5B%5D=not_reviewable&per_page=10. Accessed 29 March 2019.

Maryland Birdlife 68(1):9–12

First Record of Crested Caracara (*Caracara cheriway*) in Maryland

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At 6:08 p.m. on 10 June 2017, I was on Drayden Road, Saint Mary's County, Maryland, approaching the intersection of Flat Iron Road. Earlier in the week, a Red-tailed Hawk (*Buteo jamaicensis*) was observed near some large hay bales. I slowed down to look for the hawk and saw what I thought was a Crested Caracara (*Caracara cheriway*) standing right next to the hay bale with a small, short-tailed rodent (Rodentia: Cricetidae: Arvicolinae), likely a vole (*Microtus* sp.), in its beak (Paradiso 1969, Maryland Biodiversity Project 2018). Thankfully, I had thought to bring my camera with me when I left the house and I was scrambling to get some photos before a car would come up behind me. I took a few shots from the car on the Drayden Road side (Figure 1) and then took a few more from the other side on Flat Iron Road (Figures 2). The two roads come to a point with a small field in-between and this is where the caracara was. There was nowhere to park and no shoulders on either road, so I was stuck taking photos from my car. I took as many as I could, hoping a few would turn out, and finally had to leave due to other vehicles approaching. Fortunately, a few decent photos were taken and I posted some on my Facebook page (Hammett 2017), then decided to post a few to another bird page, where Tyler Bell saw them and asked where and when I observed the caracara. He suggested I enter them onto the MD Birding Facebook website (2017). I did and found out later that this was the first sighting of a caracara in Maryland. I had seen Crested Caracaras in bird books and a few on some photography pages on Facebook but I never expected to see one just a mile from my house in Drayden!

Crested Caracara is a bird that one would expect to see on a trip to south Texas or perhaps south of Lake Okeechobee in Florida (Figure 3). However, it seems to be a fairly recent phenomenon that they are appearing with regularity in the east, particularly in the Mid-Atlantic region (Figure 4). New Jersey seems to be the hotspot with reports from expected locations like Cape May and Sandy Hook, but also in other areas like Woodstown, Princeton, and other unlikely spots (eBird 2018). Delaware has reports from west of Bethany Beach to the Lewes/Cape Henlopen area. North Carolina, Virginia, West Virginia, Delaware, New Jersey, and Pennsylvania have all reported Crested Caracaras (eBird 2018). Crested Caracara is a bird that's been long overdue in Maryland—until now.

Figure 1. Crested Caracara (*Caracara cheriway*) carrying a small rodent. Drayden Road at the intersection of Flat Iron Road, Drayden, St. Mary's County, Maryland, 10 June 2017.

Figure 2. Crested Caracara carrying a small rodent. Flat Iron Road at the intersection of Drayden Road, Drayden, St. Mary's County, Maryland, 10 June 2017.

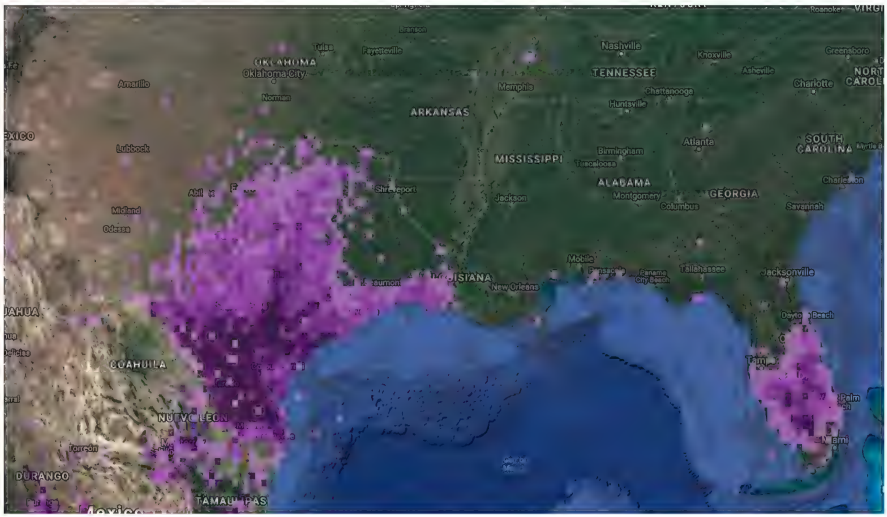

Figure 3. Expected distribution of Crested Caracara. (eBird 2018)

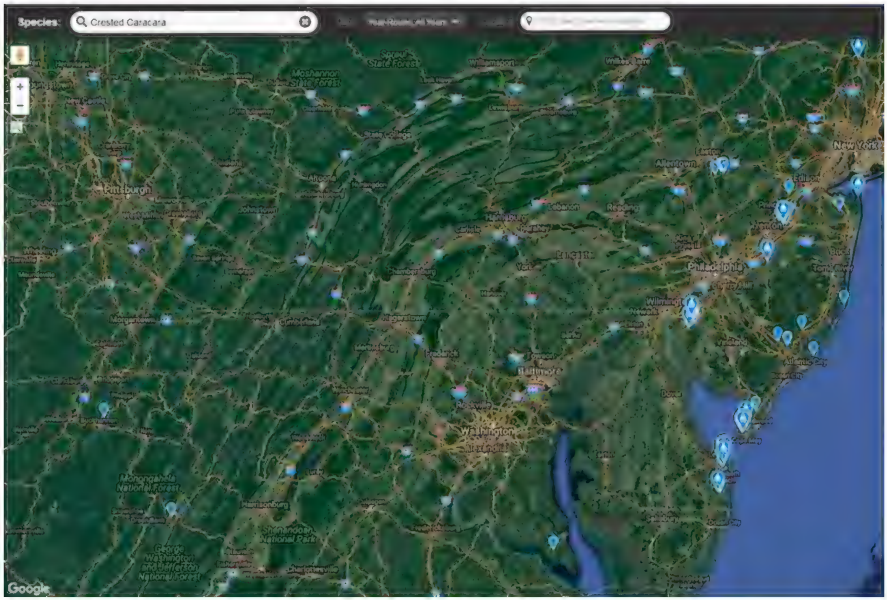

Figure 4. Mid-Atlantic Crested Caracara reports. (eBird 2018)

Note: This report (MD/2017-030), of an adult bird, was accepted in 2017 by the Maryland/District of Columbia Records Committee, which added Crested Caracara to the Official List of the Birds of Maryland (MD/DCRC 2018).

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I would like to thank the two anonymous reviewers who helped edit this note.

LITERATURE CITED

eBird. 2018. Crested Caracara. Available at: https://ebird.org/map/. Accessed March 2018.

Hammett, L. 2017. Crested Caracara (photos added 11 June 2017). Laura Hammett Photography. Available at: https://www.facebook.com/lhammettphotography/.

Maryland Biodiversity Project. 2018. Maryland Biodiversity Project, Maryland Checklist - Category: Mammals - all-time (Total: 105). Available at: https://www.marylandbiodiversity.com/viewChecklist.php?category=Mammals. Accessed 25 July 2018.

MD Birding. 2017. MD Birding Facebook Group. Formerly available at: https://www.facebook.com/groups/MDBirding/. Accessed June 2017.

MD/DCRC (Maryland/District of Columbia Records Committee). 2018. Official List of the Birds of Maryland from 1804 as of 21 June 2018. Available at: http://www.mdbirds.org/mddcrc/pdf/mdlist.pdf. Accessed 25 July 2018.

Paradiso, J.L. 1969. *Mammals of Maryland*. United States Department of the Interior, Bureau of Sport Fisheries and Wildlife, North American Fauna Number 66. United States Government Printing Office, Washington, DC. 193 pp.

Maryland Birdlife 68(1):13–22

First Record of Shiny Cowbird (*Molothrus bonariensis*) in Maryland

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On 22 October 2017, I discovered a first-year male Shiny Cowbird (*Molothrus bonariensis*) (Figure 1) in my backyard in southern Montgomery County. Around 2:00 p.m., I noticed an unfamiliar blackbird perched on one of our feeder poles about 10 ft (3 m) away from the window. My first impression was that it was a Red-winged Blackbird (*Agelaius phoeniceus*), but the bird's scapulars lacked red and its plumage was more of an iridescent blue than a glossy black. I briefly considered it might be a Brewer's Blackbird (*Euphagus cyanocephalus*) due to its iridescence, but the bird had a dark eye whereas the iris of a Brewer's Blackbird should be yellow. It also appeared smaller than either of those two species. After a few seconds of my examining it, the bird flew off its feeder pole and dropped down to the left out of sight. Still not able to identify it, I grabbed my camera and raced to another window, hoping I would have the chance to photograph it. The bird eventually waddled back into view and foraged on our lawn 10–40 ft (3–12 m) from the window. There was a flock of about 25 Brown-headed Cowbirds (*Molothrus ater*) and European Starlings (*Sturnus vulgaris*) also on the lawn, but the bird seemed only loosely associated with them and was not interacting with any particular individuals. I took as many pictures of it as I could before the entire flock took off to the north about a minute later.

In comparison with the surrounding Brown-headed Cowbirds, the bird was distinctly smaller and slimmer. Its head appeared smaller, and its bill appeared longer and more pointed with a straight culmen. Its plumage was mostly a glossy blackish-blue, particularly on its head, breast, and tail. My photos also showed some turquoise feathers in the tertials and secondaries, as well as some brown feathers in the greater coverts and primaries.

Immediately after the bird had flown, I sent texts with photos to several of my birding peers in the Youth Division of the Maryland Ornithological Society. Jerald Reb and Kojo Baidoo both identified it as a Shiny Cowbird, and I confirmed their identification after consulting my Sibley (2000) field guide. The bird's dark eyes, iridescent head and body, and small size were sufficient to eliminate every North American species except for Shiny Cowbird. I submitted a report to the Maryland/District of Columbia Records Committee (MD/DCRC), and Phil Davis, Secretary of the MD/DCRC, aged the bird as a first-year male after examination of my photos, due to the brown feathers in its primaries

Figure 1. First-year male Shiny Cowbird, *Molothrus bonariensis*. Bethesda, Montgomery County, Maryland; 22 October 2017.

(Lowther and Post 1999). I texted other birders of my sighting and the access guidelines they should follow, but, despite diligent searching, the bird was not relocated that day or for weeks afterward.

An entire month had passed without any observations when the bird turned up again in our yard around noon on 22 November 2017. I informed the birding community, and others re-sighted it that evening. In the following days, it was discovered that the bird was frequenting a secluded backyard around the block, where it was being fed regularly by the homeowner. The bird was seen consistently until 15 January 2018 by over 180 birders. The Montgomery County Shiny Cowbird was accepted by the MD/DCRC and placed on the official list of Maryland birds in January 2018 (MD/DCRC 2018).

NORMAL RANGE

The Shiny Cowbird is native to South America, occurring throughout much of the continent from southern Argentina to northern Costa Rica (eBird 2019). In the last century, the species began expanding its range through the West Indies (Post and Wiley 1977, Raffaele et al. 1998). In 1985, the first Shiny Cowbird was recorded in United States on Lower Matecumbe Key in Florida (Paul 1985). By 1991, the Shiny Cowbird was considered a permanent resident of south Florida (Lowther and Post 1999). Today, the Shiny Cowbird is uncommon and local in coastal south Florida, very rare or casual in the Southeast north to South Carolina and west to central Texas, and accidental elsewhere (Dunn and Alderfer 2017).

NORTHEASTERN AND MID-ATLANTIC RECORDS

The Shiny Cowbird moved into South Carolina in 1990 (CBCBRC 2018) and North Carolina in 1989 (CBCBRC 2018). It progressed north and has been reported from many northeastern states. It was first recorded in Virginia in 1996 (VARCOM 2018). Table 1 shows the state-bird-records-committee-accepted records for Shiny Cowbird in the Atlantic coastal region north of Florida. In Florida, Shiny Cowbirds are not a review species (FOSRC 2018). Shiny Cowbirds have been sighted in Maine, Massachusetts, Pennsylvania, Maryland, Virginia, North Carolina, South Carolina, and Georgia (Table 1), as well as in Alabama, Texas, Oklahoma, Tennessee, and Michigan (Table 2) (eBird 2019), and in New Brunswick (Lamèque, 5 August 1993) and Nova Scotia (Canso, 13–14 June 2004), Canada (Christie et al. 2004, Kavanaugh and Crane 2004, NSBS 2019). Records are clustered between Georgia and North Carolina (n = 54), with all the other states having one record each (Table 1). Records have occurred in every month of the year, with the majority of records occurring in May (n = 14), June (n = 17), and July (n = 12) (Table 3). It is worth noting that Maryland has the only record of this species in winter away from the southeastern Atlantic Coast.

Table 1. Summary of official state-bird-records-committee-accepted records of Shiny Cowbird, *Molothrus bonariensis,* in the Atlantic coastal region. States are ordered north to south. NWR = National Wildlife Refuge; WMA = Wildlife Management Area.

State	Date	Location	County
Maine (MBRC 2018)	24–26 May 1991	Monhegan	Lincoln
New Hampshire (NHRBC 2010)	(No records)		
Vermont (VBRC 2018)	(No records)		
Massachusetts (MARC 2018)	14 Oct 2002	Herring Creek Farm, Edgartown	Dukes
Rhode Island (RIARC 2018)	(No records)		
Connecticut (ARCC 2017)	(No records)		
New York (NYSOA 2018)	(No records)		
Pennsylvania (PORC 2018)	2 Jun 2013	Hampton	Adams
New Jersey (NJBRC 2017)	(No records)		
Delaware (DBRC 2018)	(No records)		
Maryland/DC (MD/DCRC 2018)	22 Oct 2017–15 Jan 2018	Parkwood, Bethesda	Montgomery
West Virginia (WVBRC 2018)	(No records)		
Virginia (VARCOM 2018)	19 Aug 1996	Surry	Surry
North Carolina (CBCBRC 2018)	16 Nov 1989	Aurora	Beaufort
	9–29 Oct 1990	New Bern	Carteret
	30 Oct 1991	Fayetteville	Cumberland
	29 Oct–14 Nov 1992	Cape Carteret	Carteret
	Jun 1993	Figure Eight Island	New Hanover
	Jun 1993	Cape Lookout	Carteret
	Early Jan–Mid Feb 1994	Wilmington	New Hanover
	26 May 1995	Cedar Island	Carteret
	9 Nov 1996	Winston-Salem	Forsyth
	15 May 1997	Cedar Island	Carteret
	9 Jul 1997	Stumpy Point	Dare
	8–11 Jul 1998	Fort Fisher	New Hanover
	8 May 1999	Fayetteville	Cumberland
	7 Jun 1999	Cedar Island	Carteret

State	Date	Location	County
	30 Jun 1999	Lola	Carteret
	14 May 2000	North Topsail Beach	Onslow
	26–29 May 2000	Bodie Island	Dare
	Early Jul 2000	Fort Macon	Carteret
	7 Oct 2002	Cedar Island	Carteret
	23 Jul–7 Nov 2004	Pea Island NWR	Dare
	19–20 Jan 2005	Goose Creek State Park	Beaufort
	13 May 2005	Fort Macon	Carteret
	30 May 2008	Pea Island NWR	Dare
	14 Jun 2008	Hillsborough	Orange
	13 Jun 2009	Oregon Inlet	Dare
	25 May–5 Aug 2017	Fort Macon State Park (likely breeding)	Carteret
	1 Jun 2017	Sneads Ferry	Onslow
	20 Apr–20 May 2018	Fort Macon State Park	Carteret
South Carolina (CBCBRC 2018)	3–24 Jun 1990	James Island	Charleston
	30 Apr–13 Jul 1991	Sullivan's Island	Charleston
	25 Mar 1995	Lone Star	Calhoun
	4 Jul 1995	Mount Pleasant	Charleston
	26 Nov 1996	Huntington Beach State Park	Georgetown
	5 Jun–12 Jul 1997	Harbor Island	Beaufort
	18–25 Jun 1998	Savannah Spoil Site	Jasper
	3 Aug 1998	Savannah Spoil Site	Jasper
	Late May 1999	Harbor Island	Beaufort
	13 Jun 1999	Sullivan's Island	Charleston
	1–2 Jul 1999	Savannah Spoil Site	Jasper
	27–28 Aug 1999	Cape Romain NWR	Charleston
	10 May 2000	Savannah Spoil Site	Jasper
	16 Oct 2001	Huntington Beach State Park	Georgetown
	1 Apr 2002	Savannah Spoil Site	Jasper
	6 Jul 2002	Edisto Island	Charlestown or Colleton
	19 May 2003	Savannah Spoil Site	Jasper
	8 Jul 2003	Mount Pleasant	Charleston
	18–19 Jul 2003	Savannah Spoil Site	Jasper
	13 Aug–14 Sep 2003	Savannah Spoil Site	Jasper
	25 Sep 2004	Folly Beach	Charleston
	14 Jun 2006	Huntington Beach State Park	Georgetown
Georgia (GCRC 2019)	28 Oct 2006	Altamaha WMA	McIntosh
	9 Sep 2007	Brunswick	Glynn
	6 Jun 2013	Blackbeard Island NWR	McIntosh
	3 Jun 2016	Tybee Island	Chatham
Florida (FOSRC 2018)	Resident in southern FL; non-review		

Table 2. eBird reports of Shiny Cowbird from the United States, excluding Florida and coastal Alabama, Mississippi, and Louisiana (eBird 2019). States are ordered north to south. *Italics* means the eBird report is not found in the official bird records for that state.

State	Date	Location
Michigan	3–4 Jun 2017	Whitefish Point
Maine	25 May 1991	Monhegan Island
Massachusetts	14 Oct 2002	Edgartown
Pennsylvania	2 Jun 2013	Adams
Maryland	22 Oct 2017–15 Jan 2018	Bethesda
Virginia	19 Aug 1996	Surry
Oklahoma	12–14 Jun 1990	Wichita Mountains Wildlife Refuge
Tennessee	6–20 Jul 1995	President's Island
Texas	3 Feb 2000	Houston
	15 Apr 2001	Port O'Connor
	26 Apr 2003	Jefferson
North Carolina	12 Jul 1998	Fort Fisher
	23 Jul–12 Nov 2004	Pea Island National Wildlife Refuge
	19 Jan 2005	Goose Creek State Park
	30 May–13 Jun 2013	*Pea Island National Wildlife Refuge*
	25 May–5 Aug 2017	Fort Macon State Park
	20 Apr–20 May 2018	Fort Macon State Park
Alabama (inland)	20 May 2003	Cleburne
South Carolina	26 Jun 1990	Charleston
	25 Jun 1997	Harbor Island
	18–25 Jun 1998	Savannah Spoil Site
	28 Jul 1998	Sullivan's Island
	1 Jul–1 Sep 1999	Savannah Spoil Site
	24 Sep 1999	*Sullivan's Island*
	10 May 2000	Savannah Spoil Site
	1 Apr 2002	Savannah Spoil Site
	4 Jun–13 Sep 2003	Savannah Spoil Site

State	Date	Location
	7 Sep 2003	*Harbor Island*
	18 Jun–2 Oct 2004	Savannah Spoil Site
	7 Jun 2006	*Savannah Spoil Site*
	7 Jul 2018	*Hardeeville*
Georgia	15 May 1989	Cumberland Island National Seashore
	26 Jun 1998	*Soggy Meadows Farm*
	24 Jan 1999	*Soggy Meadows Farm*
	16 Nov 1999	*Soggy Meadows Farm*
	5–7 May 2000	Jekyll Island
	28 Oct 2006	Altamaha Wildlife Management Area
	27 May 2007	*Darien*
	25 Sep 2007	Brunswick
	3 Jun–23 Jul 2016	Tybee Island

Table 3: Number of Shiny Cowbird state-bird-records-committee-accepted records per month, 1989–2018: Maine to Georgia. Data were obtained from Table 1. Note: Official Georgia records were only accessible from 2002 onward.

Month	Number of Records
January	3
February	1
March	1
April	3
May	14
June	17
July	12
August	6
September	4
October	9
November	6
December	1

The first record of the species in the Atlantic coastal region was in 1989. Since then, there have been 28 records from the 1990s, 23 records from the 2000s, and 7 records from the 2010s. Since 2004, there have been only three records of this species north of North Carolina: Pennsylvania in 2013 (Table 1), Michigan in 2017 (Table 2; eBird 2019), and Maryland in 2018.

Given that the Shiny Cowbird was found in Virginia in 1996 and Pennsylvania in 2013, it is surprising that this species was not recorded in Maryland until the 2018 Montgomery County bird.

LITERATURE CITED

ARCC (Avian Records Committee of Connecticut). 2017. Checklist of Birds of Connecticut (24 June 2017). Available at: http://www.ctbirding.org/birds-birding/checklist-of-the-birds-of-connecticut/. Accessed 11 January 2019.

CBCBRC (Carolina Bird Club Bird Records Committee). 2018. Chat databases. Available at: https://www.carolinabirdclub.org/chat/database.html. Accessed 11 January 2019.

Christie, D.S., B.E. Dalzell, M. David, R. Doiron, D.G. Gibson, M.H. Lushington, P.A. Pearce, S.I. Tingley, and J.G. Wilson. 2004. *Birds of New Brunswick: An Annotated List.* A project of the New Brunswick Bird Records Committee. New Brunswick Museum, Monographic Series (Natural Science) No. 10, St. John, New Brunswick, Canada. 84 pp.

DBRC (Delaware Bird Records Committee). 2018. Summary of Completed Reviews (September 2018). Available at: https://www.dosbirds.org/wp-content/uploads/2018/09/List-of-Ajudicated-Records.pdf. Accessed 11 January 2019.

Dunn, J.L., and Alderfer, J. 2017. *Field Guide to Birds of North America*, Seventh Edition. National Geographic Society, Washington, DC. 591 pp.

eBird. 2019. Shiny Cowbird. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, NY. Available at: http://www.ebird.org. Accessed 12 January 2019.

FOSRC (Florida Ornithological Society Records Committee). 2018. Official Florida State Bird List. Available at: http://www.fosbirds.org/florida-bird-list.html. Accessed 11 January 2019.

GCRC (Georgia Checklists and Record Committee). 2019. Completed Records: 2003–2017. Available at: https://www.gos.org/checklist-and-records-committee#past. Accessed 11 January 2019.

Kavanaugh, T., and T. Crane. 2004. Rare Bird Report: Nova Scotia's first and Canada's second Shiny Cowbird. *Nova Scotia Birds* 46(4):22. Available at: https://docs.google.com/viewer?url=https://www.nsbirdsociety.ca/library/library-introduction/older-publications/vol-46-number-4-autumn-2004/download?p=1. Accessed 14 February 2019.

Lowther, P.E., and W. Post. Birds of North America. 1999. Shiny Cowbird (*Molothrus bonariensis*), version 2.0. In: The Birds of North America (A.F. Poole and F.B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY. Available at: https://birdsna.org/Species-Account/bna/species/shicow/introduction. Accessed 11 January 2018.

MARC (Massachusetts Avian Records Committee). 2018. Official State List (September 2018). Available at: http://maavianrecords.com/official-state-list/. Accessed 11 January 2019.

MBRC (Maine Bird Records Committee). 2018. Official List of Maine Birds (14 October 2018). Available at: https://sites.google.com/site/mainebirdrecordscommittee/official-list-of-maine-birds. Accessed 11 January 2019.

MD/DCRC (Maryland/District of Columbia Records Committee). 2018. MD/DCRC Database Abridged Version, Maryland, (21 June 2018). Available at: https://mdbirds.org/wp-content/uploads/2018/06/mddatabase.pdf Accessed 11 January 2019.

NHRBC (New Hampshire Rare Bird Committee). 2010. New Hampshire State Bird List (20 April 2010). Available at: https://nhbirdrecords.org/new-hampshire-state-bird-list/. Accessed 11 January 2019.

NJBRC (New Jersey Bird Record Committee). 2017. New Jersey State List (12 December 2017). Available at: http://njbrc.com/index.php/state-and-review-lists/. Accessed 11 January 2019.

NSBS (Nova Scotia Bird Society). 2019. The Birds of Nova Scotia. Available at: https://www.nsbirdsociety.ca/library/resources/the-of-birds-of-ns. Accessed 14 January 2019.

NYSOA (New York State Ornithological Society). 2018. Checklist of New York State Birds (21 December 2018). Available at:

https://nybirds.org/Publications/ChecklistNYS.htm. Accessed 11 January 2019.

Paul, R.T. 1985. The Nesting Season June 1–July 31, 1985: Florida Region. *American Birds* 39(5):902–905.

PORC (Pennsylvania Ornithological Records Committee). 2018. The Official List of the Birds of Pennsylvania (30 June 2018). Available at: https://pabirds.org/records/wp-content/uploads/2018/08/PORC2018-annotated-list.pdf. Accessed 11 January 2019.

Post, W., and J.W. Wiley. 1977. The Shiny Cowbird in the West Indies. *The Condor* 79(1):119–121.

Raffaele, H., J. Wiley, O. Garrido, A. Keith, and J. Raffaele. 1998. *A Guide to the Birds of the West Indies*. Princeton University Press, Princeton, NJ. 512 pp.

RIARC (Rhode Island Avian Records Committee). 2018. Checklist of Rhode Island Birds (July 2018). Available at: http://www.ri-avianrecords.org/. Accessed 11 January 2019.

Sibley, D.A. 2000. *The Sibley Guide to Birds*. Alfred. A. Knopf, New York, NY. 544 pp.

VARCOM (Virginia Avian Records Committee). 2018. The Birds of Virginia and its Offshore Waters: The Official List (25 June 2018). Available at: http://www.virginiabirds.org/varcom/official-state-list/. Accessed 11 January 2019.

VBRC (Vermont Bird Records Committee). 2018. Vermont Bird Checklist (24 July 2018). Available at: https://vtecostudies.org/wildlife/wildlife-watching/vbrc/bird-checklists/. Accessed 11 January 2019.

WVBRC (West Virginia Bird Records Committee). 2018. West Virginia State Bird List (28 February 2018). Available at: www.brooksbirdclub.org/west-virginia-bird-records-committee.html. Accessed 11 January 2018.

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Near Catastrophe to Recovery: A Northern Bobwhite (*Colinus virginianus*) Success Story in Maryland

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Abstract: Standardized fall covey counts and summer male whistling counts were conducted between 2009 and 2017 to monitor a wild Northern Bobwhite (*Colinus virginianus*) population on Chino Farms in Queen Anne's County, Maryland. The bobwhite population declined by an estimated 93% from 35 coveys to less than 3 between fall 2009 and fall 2010, presumably due to two historic blizzards in February 2010. Annual population increases resulted in approximately 43 coveys on the property by 2017. Summer male whistling counts increased from an average of 0.07 calling males per survey stop in 2010 to an average of 2.78 males per stop in 2017. Population recovery was greatest in grassland areas with a high proportion of native warm season grasses as well as in areas on the property that had higher bobwhite populations prior to the snow event. The results highlight the importance of creating and maintaining large, contiguous areas of grassland with interspersed early-successional woody habitat on the landscape.

Northern Bobwhite (*Colinus virginianus*; hereafter, bobwhite) populations have declined range-wide since the at least the 1960s, with some of the greatest declines occurring in the Mid-Atlantic region (Sauer et al. 2017). Declines have been attributed to various factors including increased development, habitat loss, changes in modern farming practices, and habitat succession (Brennan 1991, Guthery et al. 2000, Washburn et al. 2000, Williams et al. 2004, Brennan and Kuvlesky 2005, Flock 2006, Lohr et al. 2011). When habitat becomes limited or less than ideal, bobwhites suffer increased pressure from meso-mammal and avian predators which further stresses already dwindling populations (Hughes et al. 2005). Williams et al. (2003) demonstrated that there is greater variability in peripheral bobwhite population densities due to greater sensitivity to environmental fluctuations during October through January in Kansas.

Severe winter weather events have also been shown to have serious negative effects on bobwhite populations (Roseberry 1964, Roseberry and Klimstra 1984, Robel and Kemp 1997), particularly along the northern latitudinal edges of the bobwhite range (Errington 1936, Leopold 1937, Peterjohn 2001, Lohr et al. 2011, Janke and Gates 2012, Janke et al. 2017), or in small isolated populations (Williams et al. 2003). Intra-seasonal survivorship can fluctuate widely during the winter period when many selective pressures influence the number of birds that survive to enter the breeding season (Guthery et al. 2000). As in other northern parts of the bobwhite range, the Mid-Atlantic region can experience extreme snow events, either high snow accumulation over a short period of time or prolonged snow coverage, which present challenges for bobwhites (Lohr et al. 2011, Janke et al. 2017). Snow events can increase exposure to predation, limit access to food and cover (Janke et al. 2017, McLaughlin et al. 2019), and effect thermoregulation (Swanson and Weinacht 1997). Bobwhites utilize thick woody cover in the form of hedgerows and shrub thickets for protection. Areas that lack this appropriate winter cover often experience larger bobwhite population decreases than areas with extensive cover (Williams et al. 2000, Seckinger et al. 2008, Janke and Gates 2013, Janke et al. 2015), particularly in agricultural dominated landscapes (Hughes et al. 2005). Low breeding populations that exist after extreme winter snow events can take many years to recover (Janke et al. 2017). Using North America Breeding Bird Survey data, Janke and co-authors (2017) found a continued negative effect on bobwhite abundance for at least four years in Ohio after a severe winter snow event. If sufficient areas of nesting and brood rearing habitat exist, populations can rebuild, but populations in areas with marginal nesting habitat can take much longer to rebound or simply disappear (Guthery et al. 2000, Janke et al. 2017).

Here we present the monitoring results from 2009–2017 and discuss how habitat and management may be influencing the bobwhite population on the farm. We initiated bobwhite covey calling counts in fall 2009 and began male whistling counts in summer 2010. The counts have been conducted on an annual basis since, allowing us to monitor the population and assess management activities on the farm. In addition to helping us evaluate our management efforts and document population fluctuations our hope is that data presented here on bobwhite habitat associations will aid, guide and inspire other working lands throughout the Delmarva to increase and manage lands dedicated to Northern Bobwhite.

METHODS

Surveys were conducted on Chino Farms (39.231022°, -76.005853°) which is a 2,047 ha (5,059 ac) property in northern Queen Anne's County, Maryland. The property was recently gifted to Washington College and the name of the property has been changed to the River and Field Campus, but for consistency

and clarity we will refer to the property as Chino Farms here. Chino Farms is a multi-use property with approximately two-thirds of the land dedicated to modern precision agriculture, the remaining land is a mix of varied habitat types including large native grasslands, field buffers, mature deciduous woods, creeks, and rivers. Approximately 304 ha (750 ac) are managed as bobwhite habitat. An effort was made after 2010 to create additional areas of woody escape cover on the farm, this included planting shrub islands and altering our management activities in specific areas to allow for more shrub/scrub habitat.

We used two widely used monitoring methodologies to assess bobwhite populations: fall covey counts and summer whistle counts. These surveys are considered to be minimally intrusive techniques to provide a reasonable index of the population over the area surveyed when conducted by experienced observers (Wellendorf et al. 2004, Wellendorf and Palmer 2005, although see Norton et al. 1961 and DeMaso et al. 1992). These population indices can help in determining the effects of habitat management activities on local bobwhite populations. In 2009, covey counts were initiated on Chino Farms as part of a radio telemetry study (see Janke et al. 2017 for more details). In fall, bobwhites give a distinctive "koi-lee" covey call in the morning. During covey count surveys, trained researchers recorded the number of individual coveys calling to index fall bobwhite abundance (Stoddard 1931, Stokes 1967). Covey call monitoring was conducted between 9 October and 5 November in years 2009–2012 and 2015–2017 on Chino Farms. Twelve point-count listening locations with a 500 m (1640 ft) radius were established in 2009 and surveyed each year (Figure 1), with the exception of point-count location #12 which was discontinued in 2015 because a released bobwhite hunting operation was established in close proximity to the count location.

The 12 point-count locations were located in areas with varying amounts of what we determined to be suitable bobwhite habitat. Assuming a 500-m (1640-ft) listening radius around each point, each point-count covered 78.5 ha (194 ac) for a total 942 ha (2,328 ac) sampled across the 2,047 ha (5,059 ac) property. In order to place all the count locations in appropriate habitat throughout the farm, some points had overlapping listening areas. Care was taken not to double count calling birds at these locations. Landscape attributes were classified and mapped within each listening area using ArcMAP 10.3 (Esri 2014; Table 1). While all landscape features were mapped, specific habitat types considered to be suitable quail habitat within each listening area included: native warm season grasses, early successional habitat, hedgerows, managed woods.

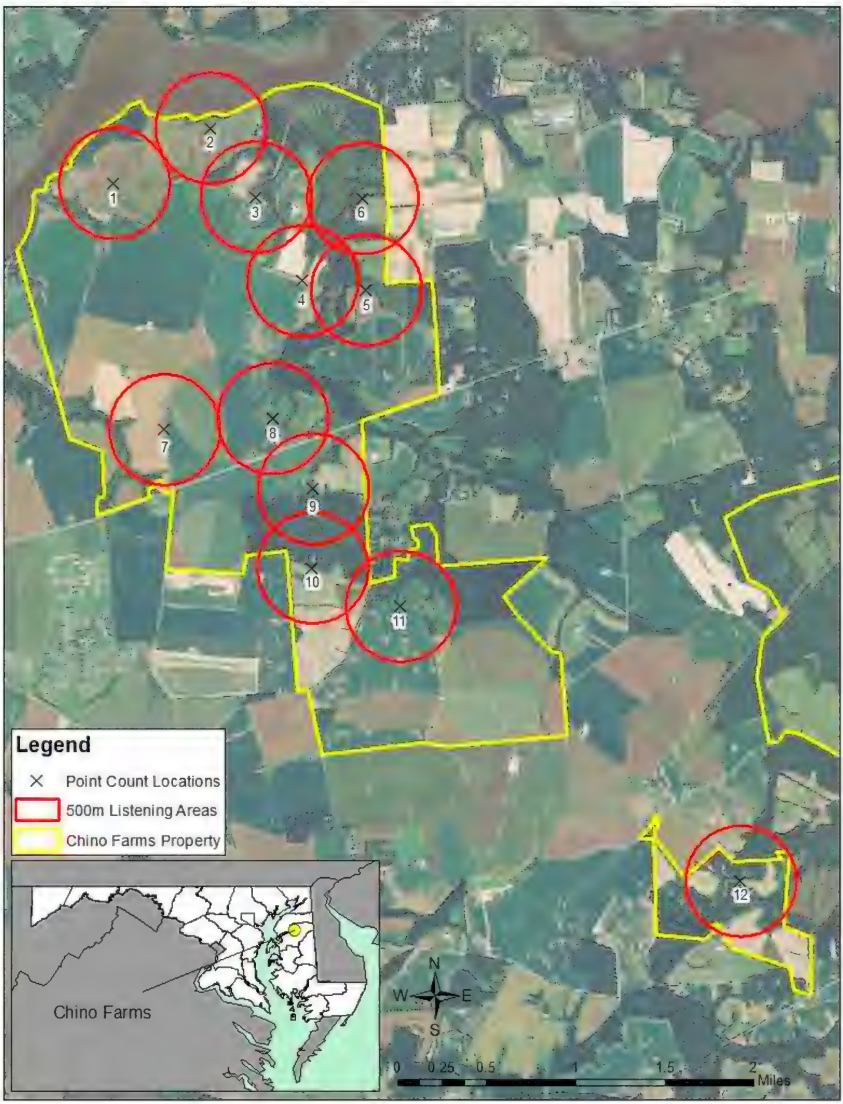

Figure 1. Map depicting 12 point-count locations and Chino Farms property boundaries located in Queen Anne's County, Maryland.

Table 1. Percentage of each habitat type located within each 78.5-ha (194-ac) point-count (PC) area on Chino Farms, Queen Anne's County, Maryland.

	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	PC 10	PC 11	PC 12
Warm Season Grass	59.1	39.6	5.6	6.2	6.4	1.6	0.8	16.3	1.4	0	0.6	3.4
Early successional Habitat	6.3	9.5	7.3	2.2	3.2	2.3	4.6	0.2	2.6	4.4	13.2	2.1
Hedgerow Rows	2.8	1.6	4.1	4.0	14.2	4.8	0	3.1	1.2	3.8	1.7	6.7
Managed woods	0	0	0	0	0	22.7	0	2.0	5.2	0	4.8	0
Other - Quail Habitat[1]	1.3	1.3	2.2	3.4	12.2	10.5	0	1.2	1.9	0.9	2.0	1.8
Agricultural Land	9.0	1.7	53.8	49.2	28.1	22.0	84.9	55.2	45.7	42.6	48.9	33.4
Deciduous Woods	15.4	7.5	20.5	24.2	27.3	12.5	5.7	12.8	39.7	47.9	25.0	51.3
Other - Non-Quail Habitat[2]	6.1	38.9	6.6	10.7	8.7	23.6	4.0	8.7	2.4	0.4	3.9	1.4

[1]Including: planted food plots, shrub islands, shrub lespedeza (*Lespedeza bicolor* Turcz. [Fabaceae]) plots, switchgrass (*Panicum virgatum* L. [Poaceae]) agricultural fields.
[2]Including: river, ponds, marsh, Delmarva Bays, pasture, tall fescue areas (*Festuca arundinacea* [Schreb.] Dumort., nom.cons. [Poaceae]), developed.

We visited each point-count location one or two times during the survey season when covey calling behavior was most active. For those years when two surveys were conducted, we combined and averaged the number of coveys heard for both surveys. Surveys began 45 minutes prior to local sunrise time and ended at sunrise. Surveys were only conducted when there was <50% cloud cover, <5mph wind velocity, and typically with steady or rising barometric pressure (Wellendorf et al. 2004). No surveys were conducted in rain. The number and location of coveys calling were recorded at each point. Because the calling rate is affected by several variables, we adjusted the raw data using a model that incorporated wind speed, temperature, cloud cover, and barometric pressure change following recommendations by Wellendorf et al. (2004).

Summer whistle surveys were conducted between 2 June and 2 August in years 2010–2017 on Chino Farms using the same 12 point-count listening stations used for the covey calling counts. As with the fall counts, point # 12 (Figure 1) was discontinued in 2015. Summer whistling counts record the number of calling males vocalizing in the morning as an index to the breeding population and can be used as a predictor of fall population levels (Bennitt 1951, Rosene 1957, Curtis et al. 1989, Church et al. 1993, Terhune et al. 2009). During summer, each point was surveyed for 5 minutes and the number of males heard calling was recorded. The survey started at local sunrise and all 12 points were completed <2 hours of sunrise. The route was reversed each day the survey was

conducted so that starting times at each point varied across the season. The route was surveyed 5–8 times per summer and then route totals were averaged.

RESULTS

Our monitoring efforts documented a severe population crash following historic back-to-back winter weather events during February 2010. Regional average winter snow accumulation for November–March, 1893–2009, was 44.2 cm (17.4 in) (range 0–131.6 cm [0–51.8 in]) compared to a total of 124.2 cm (48.9 in) in winter 2009–2010 (NECI 2018). Average snow accumulation for the month of February, 1893–2009 was 16.5 cm (6.5 in) (range 0–87.4 cm [0–34.4 in]) compared to 98.8 cm (38.9 in) in February 2010 (NECI 2018; Figure 2). The number of estimated coveys in the surveyed area declined 93% from 35.2 in 2009 to 2.5 in fall 2010. However, covey numbers heard subsequently increased to a high of 43.0 coveys in 2017. With the exception of 2016 the number of coveys increased each year (Table 2, Figure 3). In 2017, 42.8 coveys were estimated to be present, surpassing the number prior to the snow storms. Summer male whistling counts followed a similar trajectory as the covey counts (Table 3). In 2010, the first season of counts, an average of 0.07 individual males were detected per survey stop compared to an average of 2.78 individuals per stop in 2017 (Figure 3).

Discounting temporal increases in the population, we saw higher average point-count density in areas dominated with native warm season grasslands and interspersed woody cover (which we additively term "suitable habitat") which exhibited higher average population response following 2010 (fall $R^2 = 0.6951$ and summer $R^2 = 0.7042$) (Figure 4A). This is in contrast to areas with higher proportions of agricultural land (fall $R^2 = 0.4424$ and summer $R^2 = 0.4704$) or deciduous woods (fall $R^2 = 0.1994$ and summer $R^2 = 0.2536$) (Figures 4B and C). For example, an average of 4.6 calling males were heard around point-count #1, an area with the highest proportion of suitable habitat, compared to an average of only 0.5 calling males in the area with the highest proportion of agricultural land, point-count #7, and an average of 0.2 calling males in areas dominated by deciduous woodlands, point-count #10 (Tables 1 and 3). Number of calling coveys also varied by type and percent cover of habitat with more coveys detected in areas dominated by native grasses, e.g., points #1 and #2, compared to areas with a higher ratio of agricultural land, e.g., points #7 and #8, (Tables 1 and 2).

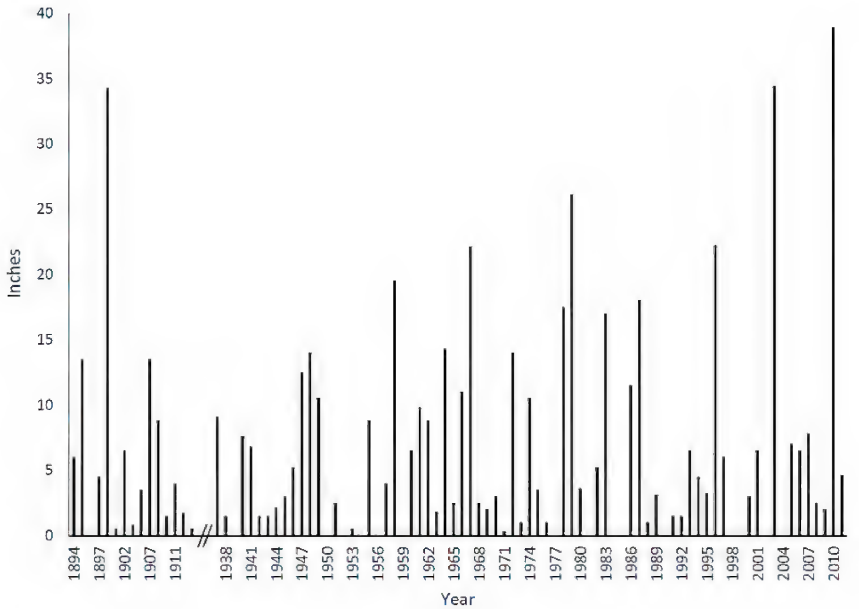

Figure 2. Snow fall accumulation for the month of February 1894–2011 (excluding years 1914–1936 when data were not collected) in Chestertown, Queen Anne's County, Maryland. (NECI 2018).

Table 2. Adjusted number of calling coveys at each point-count (PC) location between 2009–2017 on Chino Farms, Queen Anne's County, Maryland.

	Point-Count Locations												
Year	**PC 1**	**PC 2**	**PC 3**	**PC 4**	**PC 5**	**PC 6**	**PC 7**	**PC 8**	**PC 9**	**PC 10**	**PC 11**	**PC 12**	**Average**
2009	5.5	5.7	4.0	2.1	2.5	1.8	2.5	1.8	0.0	3.0	5.2	0.9	2.9
2010	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
2011	3.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.6	0.0	0.7
2012	6.0	5.5	1.6	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	1.5
2013	-	-	-	-	-	-	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-	-	-	-	-	-	-
2015	5.9	7.2	6.0	1.7	5.0	3.1	0.0	0.0	0.0	5.9	0.0	-	3.2
2016	6.5	5.5	4.7	2.1	4.3	1.0	0.0	1.2	2.3	0.0	1.0	-	2.6
2017	8.5	5.1	3.4	3.5	4.2	4.2	5.1	3.3	1.8	2.0	1.8	-	3.9

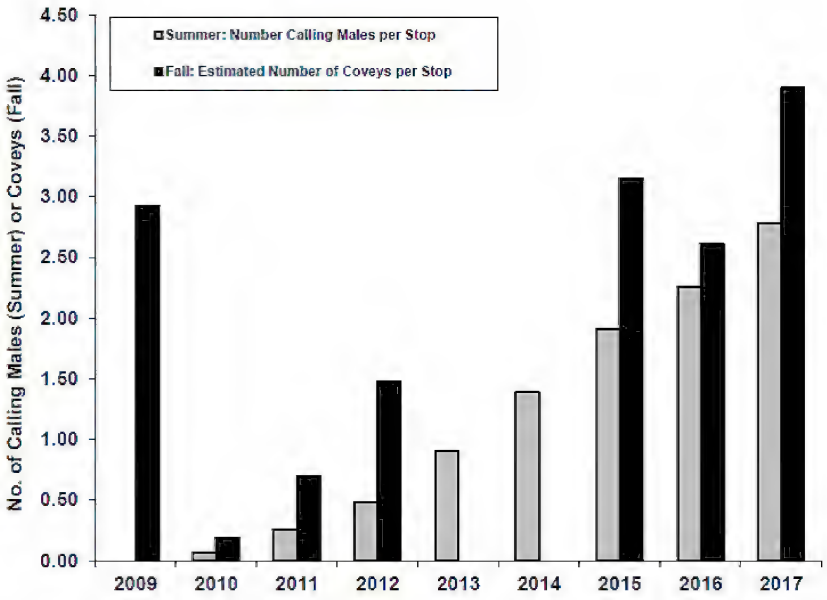

Figure 3. Number of calling males heard during the summer months (2010–2017) and estimated number of detected coveys heard during count surveys (2009–2012 and 2015–2017) on Chino Farms, Queen Anne's County, Maryland.

Table 3. Average number of calling male Northern Bobwhite at each point-count (PC) location between 2010–2017 on Chino Farms, Queen Anne's County, Maryland.

	Point-Count Locations												
Year	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	PC 10	PC 11	PC 12	Average
2009	-	-	-	-	-	-	-	-	-	-	-	-	-
2010	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
2011	1.3	0.8	0.5	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.1	0.0	0.3
2012	2.2	2.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.5
2013	3.8	4.4	1.6	0.2	0.0	0.0	0.4	0.0	0.0	0.2	0.2	0.0	0.9
2014	6.9	4.8	1.4	0.8	0.3	0.1	0.4	1.0	0.8	0.1	0.3	0.0	1.4
2015	7.0	7.2	2.2	0.6	0.2	1.6	1.6	0.6	0.0	0.0	0.0	-	1.9
2016	8.0	7.3	3.0	1.6	1.3	1.0	1.1	0.8	0.5	0.1	0.1	-	2.3
2017	7.6	8.6	3.8	1.4	3.4	3.2	0.2	1.2	0.8	0.0	0.0	-	2.7

DISCUSSION

Prior to 2010, bobwhite densities at Chino Farms were thought to be among the highest in Maryland. We documented a severe population crash in this local bobwhite population, presumably due to major back-to-back snow events in February 2010. Through continued covey counts and summer whistling counts, we documented the rapid annual increase and eventual recovery of bobwhites on the property. The number of estimated coveys exceeded pre-storm levels for the first time in 2017 (Table 2). Janke et al (2017) documented how severe snow events can have significant impacts on populations along the northern periphery of the bobwhite range. Populations in Ohio were negatively affected for 4 years post storm. The Chino Farms population showed similar negative effects for 4 years, but were more than fully recovered 8 years after the crash (Figure 3).

While the property-specific bobwhite population has recovered, it has not done so evenly. We attribute the differences to three related factors throughout the property prior to the snow events: 1) relative bobwhite population densities were not equal, 2) appropriate habitat was not evenly distributed, and 3) habitat management varied in intensity. Both before and after the snow events of 2010, the bobwhite population was highest in the large native warm season grasslands on the farm. These grasslands provided large areas of appropriate nesting and brood rearing conditions which presumably helped with overall population recovery in this area. The 2009 covey counts showed that the bobwhite population was negatively correlated to the ratio of agricultural land (Tables 1 and 2). Higher densities were found in areas containing higher proportions of grassland and other early successional land (Figure 4A). Lower quail densities were generally found in areas that contained less nesting and brood rearing habitat. In these areas, the habitat is often more fragmented in the form of linear strips alongside mature deciduous woods and drainage ditches. For example, 11 coveys were heard in the grass-dominated areas (point-counts #1 and #2) compared to less than four coveys in the agriculture-dominated areas (point-counts #7 and #8) prior to the snow events in 2010. In 2017, 13 and eight coveys were found, respectively, in these same locations (Tables 1 and 2). Thus, even with increasing quail numbers over time, these areas do not support quail in higher densities. Lastly, management on the property has primarily consisted of prescribed fire and the removal of deciduous saplings by mechanical means and herbicide application. Management activity and intensity vary across the farm. While the large warm season grassland has always been an annual management priority, other areas of the farm only receive management when time allowed, likely affecting habitat quality.

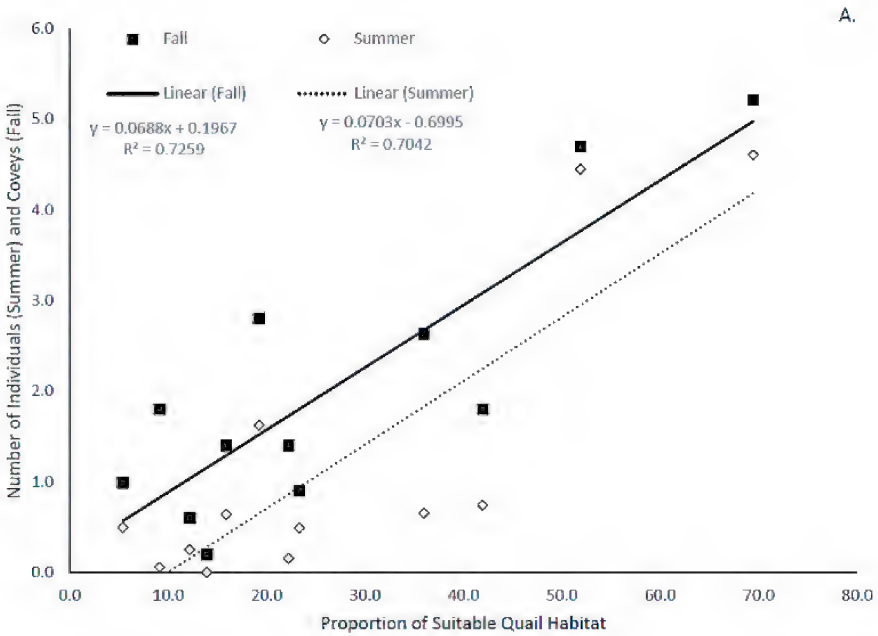

Figure 4A. Average number of calling males (2010–2017) and coveys (2009–2012 and 2015–2017) heard in relation to the proportion of suitable quail habitat (native warm season grasses, early successional habitat, hedgerows, managed woods) within each listening point-count area on Chino Farms, Queen Anne's County, Maryland, USA.

The recovery of the Chino Farms bobwhite population provides hope to land managers and researchers that small isolated populations can recover from severe weather events given the availability of suitable habitat. With the exception of an additional eight acres of new habitat, the overall amount of new habitat created between 2010 and 2017 did not increase significantly. However, the management frequency and intensity did change and varied substantially across the farm. While it is difficult to quantify the relationship between habitat, management, and pre-snow event population levels, we have seen a positive population response in areas that received management compared to areas that did not. In the grasslands, large fields (6.5–13.2 ha [16.1–32.6 ac]) were divided into smaller blocks (0.9–2.9 ha [2.2–7.2 ac]) and prescribed fire frequency was increased from a three-year rotation to a two-year rotation. In general, habitat management activities were less frequent in areas more distant to the large grasslands on the northern end of the property (Figure 1).

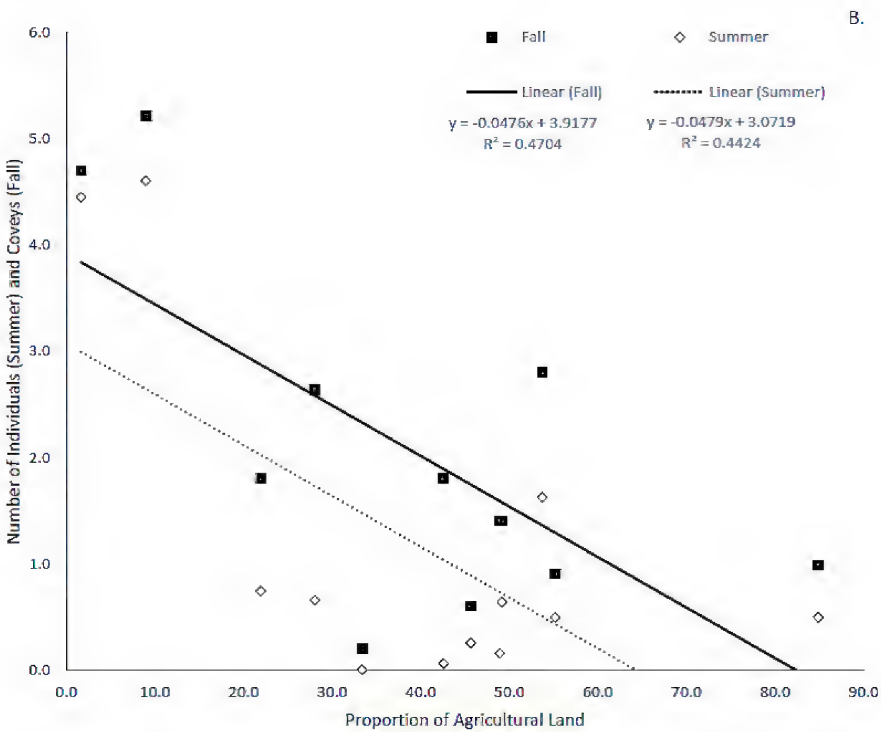

Figure 4B. Average number of calling males (2010–2017) and coveys (2009–2012 and 2015–2017) heard in relation to the proportion of agricultural land within each listening point-count area on Chino Farms, Queen Anne's County, Maryland, USA.

High-quality breeding habitat has been shown to improve adult survivorship during the breeding season in the Mid-Atlantic (Williams et al. 2004, Lohr et al. 2011) which is linked with the need of northern populations to maintain high breeding productivity for population sustainability (Roseberry and Klimstra 1984). Janke et al. (2015) showed increased survivorship in areas where a high portion of the habitat was dedicated to grass buffers and early successional woody cover. We observed similar responses in the large grasslands on Chino Farms. Creating and maintaining large areas of habitat that contains nesting habitat, brood rearing habitat, and low-growing woody escape cover in close proximity should allow isolated populations to recover after a significant collapse due to winter weather events.

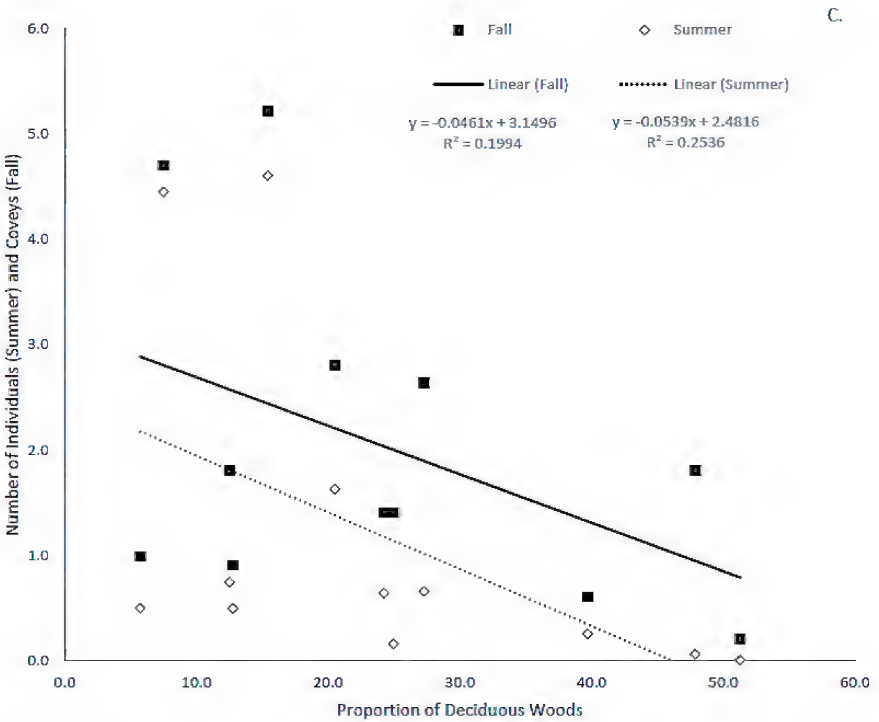

Figure 4C. Average number of calling males (2010–2017) and coveys (2009–2012 and 2015–2017) heard in relation to the proportion of deciduous woods within each listening point-count area on Chino Farms, Queen Anne's County, Maryland, USA.

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LITERATURE CITED

Bennitt, R. 1951. Some aspects of Missouri quail and quail hunting, 1938–1948. Missouri Conservation Commission Technical Bulletin 2. 55 pp.

Brennan, L.A. 1991. How can we reverse the Northern Bobwhite population decline? *Wildlife Society Bulletin* 19(4):544–555.

Brennan, L.A., and W.P. Kuvlesky, Jr. 2005. North American grassland birds: an unfolding conservation crisis? *The Journal of Wildlife Management* 69(1):1–13.

Church, K.E., J.R. Sauer, and S. Droege. 1993. Population trends of quails in North America. Proceedings of the National Quail Symposium 3:44–54.

Curtis, P.D., P.D. Doerr, R.M. Oates, and K.H. Pollock. 1989. Whistling-cock indices as a measure of Northern Bobwhite harvest in North Carolina. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 43:253–259.

DeMaso, S.J., F.S. Guthery, G.S. Spears, and S.M. Rice. 1992. Morning covey calls as an index of Northern Bobwhite density. *Wildlife Society Bulletin* 20(1):94–101.

Errington, P.L. 1936. The winter of 1934–35 and Iowa bob-whites. *The American Midland Naturalist* 17(2):554–568.

Esri. 2014. ArcGIS Desktop: Release 10.3. Redlands, CA.

Flock, B.E. 2006. Effects of landscape configuration on Northern Bobwhite in southeastern Kansas. Ph.D. Dissertation. Division of Biology, Kansas State University, Manhattan, KS. 84 pp.

Guthery, F.S., M.J. Peterson, and R.R. George. 2000. Viability of Northern Bobwhite populations. *The Journal of Wildlife Management* 64(3):646–662.

Hughes, D.W., T.M. Terhune, D.C. Sisson, and H.L. Stribling. 2005. Demographics of Northern Bobwhite on agricultural and intensively-managed bobwhite plantation landscapes. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 59:30–42.

Janke, A.K., and R.J. Gates. 2012. Temporal variability in survival of non-breeding Northern Bobwhites in Ohio. Proceedings of the National Quail Symposium 7:194–201.

Janke, A.K., and R.J. Gates. 2013. Home range and habitat selection of Northern Bobwhite coveys in an agricultural landscape. *The Journal of Wildlife Management* 77(2):405–413.

Janke, A.J., R.J. Gates, and T.M. Terhune II. 2015. Habitat influences Northern Bobwhite survival at fine spatiotemporal scales. *The Condor* 117(1):41–52.

Janke, A.K., T.M. Terhune, R.J. Gates, and C.R. Long. 2017. Northern Bobwhite population responses to winter weather along their northern range periphery. *Wildlife Society Bulletin* 41(3):479–488.

Leopold, A. 1937. The effect of the winter of 1935–36 on Wisconsin quail. *The American Midland Naturalist* 18(3):408–416.

Lohr, M., B.M. Collins, P.M. Castelli, and C.K. Williams. 2011. Life on the edge: Northern Bobwhite ecology at the northern periphery of their range. *The Journal of Wildlife Management* 75(1):52–60.

McLaughlin, J.W., D.S. Wiley, B.C. Dabbert, and T.M. Terhune. 2019. Broadcast supplemental feeding and Northern Bobwhite demographics in Texas. *The Journal of Wildlife Management* 83(1):52–63.

NECI (National Centers for Environmental Information). 2018. National Oceanic and Atmospheric Administration. Available at: https://www.ncdc.noaa.gov/cdo-web/search?datasetid=GSOM. Accessed 30 January 2018.

Norton, H.W., T.G. Scott, W.R. Hanson, and W.D. Klimstra. 1961. Whistling-cock indices and bobwhite populations in autumn. *The Journal of Wildlife Management* 25(4):398–403.

Peterjohn, B.G. 2001. *The Birds of Ohio: With Ohio Breeding Bird Atlas maps* (second edition). The Wooster Book Company, Wooster, OH. 688 pp.

Robel, R.J., and K.E. Kemp. 1997. Winter mortality of Northern Bobwhites: effects of food plots and weather. *The Southwestern Naturalist* 42(1):59–67.

Roseberry, J.L. 1964. Some responses of bobwhites to snow cover in southern Illinois. *The Journal of Wildlife Management* 28(2):244–249.

Roseberry, J.L., and W.D. Klimstra. 1984. *Population Ecology of the Bobwhite*. Southern Illinois University Press, Carbondale, IL. 304 pp.

Rosene, W., Jr. 1957. A summer whistling cock count of bobwhite quail as an index to wintering populations. *The Journal of Wildlife Management* 21(2):153–158.

Sauer, J.R., D.K. Niven, J.E. Hines, D.J. Ziolkowski, K.L. Pardieck, J.E. Fallon, and W.A. Link. 2017. The North American Breeding Bird Survey, Results and

Analysis 1966–2015. Version 2.07.2017. USGS Patuxent Wildlife Research Center, Laurel, MD.

Seckinger, E.M., L.W. Burger, Jr., R. Whittington, A. Houston, and R. Carlisle. 2008. Effects of landscape composition on winter survival of Northern Bobwhites. *The Journal of Wildlife Management* 72(4):959–969.

Stoddard, H.L. 1931. *The Bobwhite Quail: Its habits, preservation and increase.* Charles Scribner's Sons, New York, NY. 559 pp.

Stokes, A.W. 1967. Behavior of the bobwhite, (*Colinus virginianus*). *The Auk* 84(1):1–33.

Swanson, D.L., and D.P. Weinacht. 1997. Seasonal effects on metabolism and thermoregulation in Northern Bobwhite. *The Condor* 99(2):478–489.

Terhune, T.M., R.G. Hamrick, D.C. Sisson, H.L. Stribling. 2009. Summer male call index relative to nesting chronology and autumn density of the Northern Bobwhite. Proceedings of the National Quail Symposium 6:54–64.

Washburn, B.E., T.G. Barnes, and J.D. Sole. 2000. Improving Northern Bobwhite habitat by converting tall fescue fields to native warm season grasses. *Wildlife Society Bulletin* 28(1):97–104.

Wellendorf, S.D., and W.E. Palmer. 2005. Investigating the use of covey call point counts to estimate autumn density of Northern Bobwhites. *Wildlife Biology in Practice* 1(2):140–145.

Wellendorf, S.D., W.E. Palmer, and P.T. Bromley. 2004. Estimating calling rates of Northern Bobwhite coveys and measuring abundance. *The Journal of Wildlife Management* 68(2):672–682.

Williams, C.K., F.S. Guthery, R.D. Applegate, and M.J. Peterson. 2004. The Northern Bobwhite decline: scaling our management for the twenty-first century. *Wildlife Society Bulletin* 32(3):861–869.

Williams, C.K., A.R. Ives, and R.D. Applegate. 2003. Population dynamics across geographical ranges: time-series analyses of three small game species. *Ecology* 84(10): 2654–2667.

Williams, C.K., R.S. Lutz, R.D. Applegate, and D.H. Rusch. 2000. Habitat use and survival of Northern Bobwhite (*Colinus virginianus*) in cropland and rangeland ecosystems during the hunting season. *Canadian Journal of Zoology* 78(9):1562–1566.

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Bald Eagle (*Haliaeetus leucocephalus*) Mortalities in Maryland, 1988–2017

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Abstract: Bald Eagle (*Haliaeetus leucocephalus*) mortalities reported to the Maryland Department of Natural Resources were entered into a database over a 30-year period. A total of 591 Bald Eagle mortalities were reported during the period from 1988 through 2017. The probable causes of death were determined for 438 mortalities. The most common cause of death was trauma, accounting for 63% of the mortalities for which the cause of death was known. Other causes of death were electrocutions (15%), poisonings (15%), disease (3%), drownings (2%), and death by entanglement (1%). Carbamate poisoning resulted in multiple eagle deaths due to a few single events. Comparisons with other studies, both national and local, are discussed.

In 1988, sixteen Bald Eagles (*Haliaeetus leucocephalus*) were found dead in Maryland as a result of poisonings. As the eagle biologist for the Maryland Department of Natural Resources (MDNR), I started tracking the occurrences of all Bald Eagles found dead in Maryland and reported to the MDNR. That year, I created a database to track all reported eagle mortalities. I encouraged agency staff, other government agencies, wildlife rehabilitators, and the Maryland Natural Resources Police to send reports of any dead eagles to my office. Over time, a cooperative network of contributors reported eagle mortality events (Driscoll et al. 2004).

METHODS

The following information was recorded in the database for each dead eagle found or those injured ones that subsequently died: species, age, date, location, county, cause of death, band number (if banded), and comments. For most eagle mortality events, all the fields of data were reported and entered into the database with the exception of band number since most birds were not banded. However, some information was not reported or known for many of the mortalities.

For all entries, it was assumed the biologist, wildlife technician, or law enforcement officer reporting the mortality had the ability to externally examine the carcass, investigate the circumstances, and report the probable cause of death. Some carcasses were submitted to the USGS National Wildlife Health Center in Madison, Wisconsin or the U.S. Fish and Wildlife Service Forensics Laboratory in Ashland, Oregon for examination. Necropsies were also performed by the Toxicology Directorate of the Army Public Health Center, Aberdeen Proving Ground, Maryland. Many were examined by local wildlife rehabilitators and veterinarians. Probable causes of death were based on field investigations, clinical examinations, radiographs and blood tests. In most cases, full necropsies were not performed. If no necropsy was conducted and no samples collected, determining infectious diseases was not possible.

Injured Bald Eagles that were taken to veterinarians or wildlife rehabilitators and subsequently died or were euthanized, because of the severity of their injuries, were included in the mortality database. The cause of death was attributed to the cause of the injury, not the act of euthanasia. Many of these birds had their blood tested and were radiographed for shot. Necropsies were performed on many of the eagles taken to wildlife rehabilitators.

RESULTS

During the 30-year period from 1988 through 2017, there were 591 Bald Eagle mortalities reported and entered into the database. Of these, 168 were adults, 362 were immature, and ages were not reported for 61. There were also 9 dead Golden Eagles (*Aquila chrysaetos*) found in Maryland during the same time period, mostly immature birds.

The number of dead Bald Eagles found in any given year ranged from 4 to 38 (Figure 1). The general trend in the number of eagles found dead increased over the 30-year period. This was to be expected since the Bald Eagle population in Maryland had increased since the late 1970s (Therres 2005). The spike in numbers of dead eagles in 1988 and 2017 were due, in part, to several eagles dying from poisonings. The spikes in 1997 and 2003 did not have any significant poisoning events during those years. The reason for those spikes in dead eagles is unknown.

At least one dead Bald Eagle was found in every county in Maryland during the 30-year period (Table 1). Harford County had the highest number of reported dead eagles (n = 117), most of which were found on Aberdeen Proving Ground (n = 96). Aberdeen Proving Ground is a United States Army facility at the head of the Chesapeake Bay and a major concentration area for wintering Bald Eagles (Buehler et al. 1991; MDNR, unpublished data). The military base also had an active Bald Eagle monitoring program and reported all dead eagles found to my

office and the U.S. Fish and Wildlife Service (USFWS). It supported a high number of nesting pairs (Watts et al. 2014). Dorchester County had the second highest number of dead eagles (n = 62). That county had the highest breeding population of Bald Eagles in Maryland (Therres 2005) and a large number of wintering eagles at Blackwater National Wildlife Refuge (USFWS, unpublished data). The vast majority of Bald Eagle mortality events occurred in the Coastal Plain counties which correspond to where most of the Bald Eagles occur in Maryland.

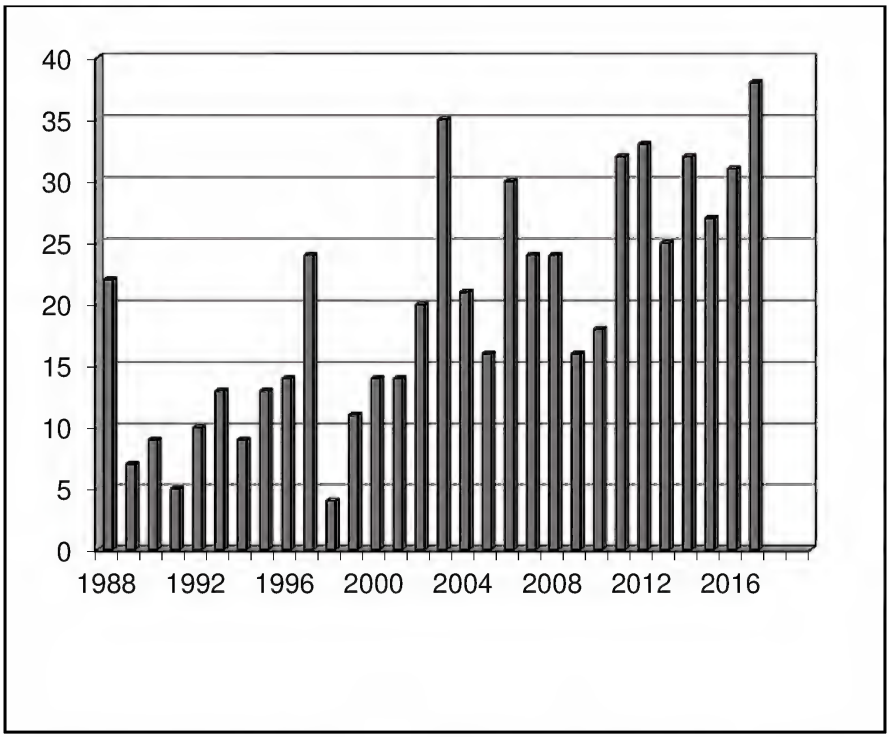

Figure 1. Number of known Bald Eagle mortalities in Maryland reported by year during the period 1988 through 2017.

The probable cause of death was determined for 74% (n = 438) of the Bald Eagle mortalities (Table 2). For the 153 deaths for which the cause of death was unknown, the carcass was either too decomposed to determine the cause or the eagle was not taken to a wildlife rehabilitator, veterinarian or lab.

Table 1. Reported eagle mortalities in Maryland by county of occurrence during the period 1988 through 2017.

County	Bald Eagles	Golden Eagles
Allegany	2	0
Anne Arundel	21	1
Baltimore	10	0
Calvert	21	0
Caroline	29	0
Carroll	1	0
Cecil	32	0
Charles	54	0
Dorchester	62	4
Frederick	2	0
Garrett	1	0
Harford	117	0
Howard	1	0
Kent	44	0
Montgomery	11	0
Prince George's	9	0
Queen Anne's	29	0
St. Mary's	30	0
Somerset	18	1
Talbot	44	0
Washington	4	0
Wicomico	14	0
Worcester	25	0
Not reported	10	3
Total	**591**	**9**

Table 2. Causes of Bald Eagle deaths reported to the Maryland Department of Natural Resources during the period 1988 through 2017.

Cause of Death	Number of Mortalities of Known Causes	Percentage of Mortalities of Known Causes
Disease/Infection	13	3
Drowning	10	2
Electrocution	66	15
Entanglement	6	1
Poisoning	66	15
Trauma	277	63
Total known causes	**438**	**100**

Cause of Death	Number of Mortalities	Percentage of Mortalities
Known causes	438	74
Unknown causes	153	26
Total	**591**	**100**

Of the Bald Eagle mortalities for which probable cause of death was determined, trauma was the major cause accounting for 63% (n = 277) of these mortalities. Included in the trauma-killed eagles were 45 (10% of all known causes) that were killed by colliding with suspended electric or telephone wires, 59 (13% of all known causes) killed by vehicles (including two by trains and three by airplanes), and 21 (5% of all known causes) that were shot. Of those that were shot, the majority (n = 13) were adult eagles.

Poisonings accounted for 15% (n = 66) of the Bald Eagle mortalities for which the cause of death was determined. The two primary types of poisonings were from lead and from carbamate pesticides such as carbofuran. Forty-one Bald Eagles were killed by carbamates, as were 7 Golden Eagles. Another 12 Bald Eagles were poisoned by other chemicals. Carbamate poisoning events usually involved several eagles. The largest mortality from a single poisoning event was 13 Bald Eagles found dead in a field on 20 February 2016 in Caroline County. In all of the carbamate poisoning events, the eagles appeared perfectly healthy but dead. In some cases, the eagle appeared to have died in mid-flight and was found dead in the middle of a field. Other eagles were found along the edges of fields presumably after falling out of trees.

Twenty Bald Eagle deaths were attributed to lead poisoning, of which 14 were adults. Death by lead poisoning is a slow process and usually only single dead eagles were recovered as a result. Eagles usually ingest lead by feeding on prey or carcasses of animals shot with lead pellets from shotguns or dead deer killed by lead bullets from rifles. The type of lead ingested was not determined or reported. Seventeen of the lead poisoned eagles died during the fall and winter. Only 3 eagles died during the spring and summer months.

Because most of the eagles were not necropsied or sampled for diseases, only 3% (n = 13) of the Bald Eagle mortalities for which probable cause of death was reported died of natural causes (i.e., disease/infection). If drownings (n = 10) were the result of catching a fish too big and subsequently being pulled under water, then 5% (n = 23) of known mortalities could have been natural. If eagle deaths resulting from fights with other eagles or ospreys are considered natural, then up to 10% of the mortalities were the result of natural causes. The remaining mortalities of Bald Eagles for which the cause of death was determined were the result of human actions.

DISCUSSION

The causes of mortality reported in this paper may not entirely represent those that affect the Bald Eagle population throughout Maryland. Not all dead eagles found in Maryland were reported to MDNR. Of the eagles found and reported to MDNR, most were from human-frequented areas. Eagles that died in remote

locations such as marshes and forests had a lower chance of being found. Perhaps those Bald Eagles were more likely to die of natural causes, and the proportion of human-caused mortalities for Maryland eagles as a whole is less than indicated by the data presented in this paper.

Trauma as the most common cause for Bald Eagle deaths documented during this study is not unusual. Many studies of Bald Eagle mortality have documented trauma as the major cause of death in various parts of the country (e.g., Deem et al. 1998, Harris and Sleeman 2007, Russell and Franson 2014). During the period 1975 to 2013, trauma accounted for a third of the 2,980 dead Bald Eagles from throughout the country examined at the National Wildlife Health Center (Russell and Franson 2014). Bald Eagle mortalities in Virginia were similar in the percentage of trauma-caused deaths in Maryland, accounting for 70% of the Bald Eagles examined by the Wildlife Center of Virginia in Waynesboro, Virginia (Harris and Sleeman 2007).

Collisions with overhead wires accounted for 16% (n = 44) of the trauma-caused mortalities in Maryland. Adding the number of electrocuted eagles (15% [n = 66]) to that results in 31% (n = 110) of the dead Bald Eagles dying because of overhead wires and the poles that support them. The percentage of eagles killed by electrocution in Maryland was similar to the national percentage (12.5%) reported by Russell and Franson (2014) and the percentage in western Canada (11.5%) reported by Wayland et al. (2003). The location that accounted for many of the electrical line mortalities in Maryland was Aberdeen Proving Ground. Mojica et al. (2009) attributed the high incidence of collisions and electrocution at Aberdeen to the location of the electrical lines relative to both vegetation and the shoreline and to the placement of the lines relative to the major flight lines used by the eagles on the Army facility; however, at least one electrocution could have been by a lightning strike (Mark S. Johnson [Aberdeen Proving Ground], in litt.). The Army has worked to remediate the electrical line problems at Aberdeen Proving Ground with a number of successful techniques. Fortunately, only 5% of Bald Eagle mortalities in Maryland during this study were the direct result of shootings. Several other eagles had shot in their bodies as determined through radiographs, but died of other causes. During the early 1960s, shooting was the major cause of death (62%) of Bald Eagles examined at Patuxent Wildlife Research Center that came from various parts of the country (Coon et al. 1970). Since shootings most likely occur in areas less frequented by humans, the low percentage documented in this study may underrepresent the true percentage of eagle mortalities in Maryland due to shooting. However, that number is likely nowhere near the percentage documented in the 1960s. Russell and Franson (2014) attributed death by shooting to 10% of the Bald Eagles examined by the National Wildlife Health Center. Shooting deaths in Maryland are more likely close to the national percentage than the 5% documented in this study.

Poisonings may have the greatest potential for impacting Bald Eagle populations. The effects of organochlorine pesticides resulted in dramatic population declines in the 1950s and 1960s (Buehler 2000). Mortalities as a result of poisonings in Maryland were below the national level of 26% (Russell and Franson 2014). They were similar to the percentage of eagles killed in western Canada by lead and pesticide poisoning (Wayland et al. 2003). The percentage of eagles killed by lead poisoning (n = 20) in Maryland (30% of poisoned Bald Eagles) was well below the national level reported by Russell and Franson (2014). They found 62% of eagles killed by poisoning were the result of lead poisoning. Franson and Russell (2014) reported the odds of lead poisoning were greater for females versus males, adults versus juveniles, and in the central U.S. compared to the Atlantic flyway. In Maryland, the ratio of lead poisoned Bald Eagles was nearly three adults for every one immature bird. Nationally, carcasses were found at greater frequency in late autumn and winter than spring and summer (Franson and Russell 2014). In Maryland, the vast majority of eagles that died of lead poisoning were also found during the fall and winter months. Franson and Russell (2014) found no evidence that lead exposure predisposed eagles to other causes of mortality.

The increase in the number of reported Bald Eagle mortalities in Maryland is to be expected due to the increase in the eagle population within the state (Therres 2005). The more eagles there are in the wild, the more likely it is that dead eagles will be found. Viewed from a population perspective, that is not cause for concern.

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LITERATURE CITED

Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*) in The Birds of North America, No. 506 (A. Poole and F. Gill, Editors) [original print version]. The Birds of North America, Inc., Philadelphia, PA. 39 pp.

Buehler, D.A., T.J. Mersmann, J.D. Fraser, and J.K.D. Seegar. 1991. Differences in distribution of breeding, nonbreeding, and migrant Bald Eagles on the northern Chesapeake Bay. *The Condor* 93(2):399–408.

Coon, N.C., L.N. Locke, E. Cromartie, and W.L. Reichel. 1970. Causes of Bald Eagle mortality, 1960–1965. *Journal of Wildlife Diseases* 6(1):72–76.

Deem, S.L., S.P. Terrell, and D.J. Forrester. 1998. A retrospective study of morbidity and mortality of raptors in Florida: 1988–1994. *Journal of Zoo and Wildlife Medicine* 29(2):160–164.

Driscoll, C., E. Miller, G.D. Therres, V. Milne, B. Findley, and K. Endress. 2004. An interagency investigation into causes of Bald Eagle (*Haliaeetus leucocephalus*) and Golden Eagle (*Aquila chrysaetos*) mortality in Maryland, 1988–2004. Proceedings of the American Association of Zoo Veterinarians, American Association of Wildlife Veterinarians, Wildlife Disease Association: Health and Conservation of Captive and Free-ranging Wildlife Joint Conference, San Diego, California, 28 August–3 September 2004. Pages 295–296.

Franson, J.C., and R.E. Russell. 2014. Lead and eagles: demographic and pathological characteristics of poisoning, and exposure levels associated with other causes of mortality. *Ecotoxicology* 23(9):1722–1731.

Harris, M.C., and J.M. Sleeman. 2007. Morbidity and mortality of Bald Eagles (*Haliaeetus leucocephalus*) and Peregrine Falcons (*Falco peregrinus*) admitted to the Wildlife Center of Virginia, 1993–2003. *Journal of Zoo and Wildlife Medicine* 38(1):62–66.

Mojica, E.K., B.D. Watts, J.T. Paul, S.T. Voss, and J. Pottie. 2009. Factors contributing to Bald Eagle electrocutions and line collisions on Aberdeen Proving Ground, Maryland. *Journal of Raptor Research* 43(1):57–61.

Russell, R.E., and J.C. Franson. 2014. Causes of mortality in eagles submitted to the National Wildlife Health Center 1975–2013. *Wildlife Society Bulletin* 38(4):697–704.

Therres, G.D. 2005. Recovery of Maryland's Bald Eagle nesting population. *Maryland Birdlife* 61(3–4):35–45.

Watts, B.D., E.K. Mojica, J.T. Paul, and J.J. Pottie. 2014. Recovery of breeding Bald Eagles on Aberdeen Proving Ground, Maryland. *Maryland Birdlife* 63(1):10–17.

Wayland, M., L.K. Wilson, J.E. Elliott. M.J.R. Miller, T. Bollinger, M. McAdie, K. Langelier, J. Keating, and J.M.W. Froese. 2003. Mortality, morbidity, and lead poisoning of eagles in western Canada, 1986–98. *Journal of Raptor Research* 37(1):8–18.

Maryland Birdlife 68(1):46–58

Osprey (*Pandion haliaetus*) Nest Success in Central Chesapeake Bay During 1975-1980

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Abstract: Presented here are 1975–1980 unpublished results from long-term Osprey, *Pandion haliaetus*, nest success studies begun in 1963 in central Chesapeake Bay. In the primary 552 km² study area, the mean number of active nests was 15% higher than the published 1970–1974 mean, and 46% higher than the published 1963–1969 mean, while mean accessible active nests was 33% and 91% higher, respectively. Higher average values over previous periods also occurred in accessible active nests with eggs (31%, 68%), accessible active nests with nestlings (43%, 100%), and accessible active nests with fledglings (40%, 99%). In 1975–1978, a larger percentage of eggs hatched (52%) than in 1970–1974 (48%) and 1963–1969 (44%) while in 1975–1980, the percentage of nestlings fledged (86%) remained near previous years (85–86%). The average number fledged per accessible active nest rose from 0.96 in 1963–1969 to 1.14 in 1970–1974 and 1.17 in 1975–1980. This suggests more eggs hatched than in previous years despite 44% in 1975–1978 being addled, cracked, broken, punctured, crushed, found as fragments in the nest, or disappeared between nest visits. Nests visited only twice annually in similar-sized north and south adjoining reference areas also showed improved average number fledged per accessible active nest compared to previous years. Results from these studies suggested an increasing number of active nests, plus the average number fledged per accessible active nest, improving since the mid-1960s with almost every year being within the estimated 0.95–1.30 range necessary for population stability.

Keywords: Chesapeake Bay, nest success, Osprey, *Pandion haliaetus*, 1970s

Studies reporting poor reproductive success in decreasing populations of Peregrine Falcon, *Falco peregrinus*, in North America and Great Britain (Ratcliffe 1958, 1963; Hickey 1969), plus Bald Eagle, *Haliaeetus leucocephalus* (Broley 1958), and Osprey, *Pandion haliaetus* (Ames and Mersereau 1964), in the United States in the late 1950s–early 1960s first brought public attention to a problem within some raptor populations. Environmental contaminants such as widely used organochlorine compounds were considered as one of the factors responsible for the declines, with the inhibition of carbonic anhydrase

responsible for causing egg shell thinning subsequently affecting reproduction (Peakall 1967, 1969; Ratcliffe 1967; Hickey and Anderson 1968). Awareness of the contaminant problem was amplified in the early 1960s with publication of the widely popular book *Silent Spring* (Carson 1962) which by the late-1960s stimulated notable government and private funding for wildlife contaminant studies. Many bird studies early in the "pesticide era" were confounded trying to gauge contaminant effects on reproductive success since no fundamental baseline reproductive data existed. Species at the top of the food chain such as fish-eating cormorants, pelicans, herons, and gulls were of particular interest for study since many organochlorine pesticides bio-magnify in the food chain. Fish-eating Osprey and Bald Eagle raptors were also of interest, but were among the species lacking reproductive data related to historically stable populations.

The reported decline in some raptor populations plus the lack of baseline reproductive data coupled with plentiful nesting Osprey along Knapp's Narrows and around Tilghman's Island in Chesapeake Bay where I resided provided opportunity to determine the reproductive success of a local nesting population. I informally monitored Osprey nesting near my home starting in 1961, and established an official study of reproductive success and related factors within a vastly expanded area in 1963. Similar Osprey studies (Dunstan 1968, Singer 1974, United States Forest Service 1974, Prevost et al. 1978, MacCarter and MacCarter 1979, Swenson 1979, Spitzer and Poole 1980, Greene and Freedman 1986) provided valuable baseline data for nesting populations in other parts of North America. However, cuts in government and private funds starting in the mid-1970s reduced these and other "pesticide era" studies by the late 1970s. I continued the central Chesapeake Bay Osprey study annually through the 1980 season with results published for 1963–1969 (Reese 1970) and 1970–1974 (Reese 1977), but not for 1975–1980.

Frequent nest visits throughout the season were of concern for possible negative effects on reproductive success in the study area. For comparison, in 1966, I established a north adjoining reference area with limited seasonal nest visits and published the results for 1966–1974 (Reese 1975). In 1968, I established a south adjoining reference area and published those results for 1968–1971 and 1972–1979 (Reese 1972, 1981).

The continuous 13 to 18 years of reproductive data and factors effecting success may be unprecedented and of considerable value to future Osprey studies. Therefore, the purpose of this paper is to document the unpublished 40–45-year-old results from these long-term studies and put them in context of circumstances during that period. No attempt is made here to put the results in context of years subsequent to that period in time, since the results were unpublished portions of on-going studies at that time, not new independent studies.

METHODS

The primary study area of 552 km² (213 mi²) is located between eastern Chesapeake Bay major tidewater tributaries of Eastern Bay and Choptank River. The northern reference area includes Eastern Bay, Crab Alley Bay, Prospect Bay, Kent Narrows and its Chester River entrance area, and Wye River. The southern reference area in Choptank River includes from the Town of Choptank west to the mouth of Island Creek on the north side and to Cooks Point on the south side. All of these areas are characterized by coves, bays, and smaller tributaries indenting the upland.

In all areas, offshore structures like hunting blinds, marine navigation markers, and artificial pole/platforms provided sites for most nests and were accessible for content viewing from a small boat. Nest sites damaged or destroyed by winter storms or ice in the primary study area were reinforced or replaced if possible with artificial nest platforms early in the following nesting season, but not in the reference areas. Nest sites were visited once every 12–15 days throughout the nesting season, but only twice per year in the reference areas, i.e., early-May to locate active nests and late-June to determine the number fledged in accessible active nests. Active sites in the primary study area included those with an adult pair present with a nest on four consecutive visits or a nest with eggs. A map showing the boundary and coordinates of the primary study area, more nest site detail, and data collection methods is given in Reese (1970, 1977). The north and the south adjoining reference areas, habitat, types of nest sites, and methodologies used are described, mapped, and noted respectively in Reese (1975) and Reese (1972, 1981).

Changes between year and active nests were compared using a linear regression. The average number fledged per accessible active nest between the study area and north reference area was compared using Students t-tests. Tests for normality and equal variances were conducted beforehand using a Shapiro-Wilk and a constant variance test, respectively. When the criteria for these tests were not satisfied, a non-parametric test (Mann-Whitney U) was used. Tests conducted between year groups were conducted using a One-Way Analysis of Variance (one-way ANOVA) assuming equal variances and normal distribution of the data. Presented here are the means and standard error of the means. Pairwise comparisons were done using the Holm-Sidak method. All statistical tests were conducted using SigmaPlot (Systat Software, Chicago, IL).

RESULTS

In the primary study area during 1975–1980, 91% (n = 860) of the active nests (n = 950) were accessible for study, 93% (n = 802) of the accessible nests contained eggs, 68% (n = 582) contained nestlings, and 61% (n = 528) contained

fledglings (Table 1). Observed eggs in 1975–1978 (1979–1980 are excluded due to fewer nest visits during the egg period than in 1975–1978) totaled 1,497 with 52% (n = 778) hatching and 42% (n = 625) fledging, while 86% of the nestlings fledged in 1975–1980. Eggs found addled (n = 112), cracked or broken (n = 9), punctured or crushed (n = 22), as fragments in the nest (n = 205), or disappearing between nest visits (n = 352) comprised 91% of the losses in 1975–1980 while young found dead in (n = 35) and outside (n = 7) the nest, in nest sites that collapsed (n = 15), and disappeared between nest visits (n = 103) accounted for 94% of nestlings lost (Table 2). In 1975–1980, the average number fledged per nest producing fledglings was 1.9 with 1.17 average number fledged per accessible active nest (Table 1).

Table 1. Reproductive success of accessible active Osprey nests in the primary study area, 1975–1980. () = %

	1975	1976	1977	1978	1979	1980	Total*	Mean*
Total active nests found	149	150	148	156	170	177	950	158
Accessible active nests	128 (86)	136 (91)	131 (89)	143 (92)	157 (92)	165 (93)	860 (91)	143
Accessible nests with eggs	121 (95)	129 (95)	129 (98)	141 (99)	147 (94)	135 (82)	802 (93)	134
Accessible nests with nestlings	85 (66)	89 (65)	103 (79)	99 (69)	92 (59)	114 (69)	582 (68)	97
Accessible nests with fledglings	81 (63)	81 (60)	80 (61)	84 (59)	88 (56)	114 (69)	528 (61)	88
Total eggs known	371	379	368	379	186	268	1497	374
Eggs per nest with eggs	3.1	2.9	2.9	2.7	1.3	2.0		2.9
Eggs hatching	178 (48)	196 (52)	209 (57)	195 (51)	169 (91)	231 (86)	778 (52)	195
Eggs fledging	162 (44)	154 (41)	158 (43)	151 (40)	153 (82)	230 (86)	625 (42)	156
Percent of nestlings fledged	(91)	(79)	(76)	(77)	(91)	(100)	(86)	
Average number fledged per nest producing fledglings	2.0	1.9	2.0	1.8	1.7	2.0		1.9
Average number fledged per accessible active nest	1.27	1.13	1.21	1.06	0.97	1.39		1.17

* Egg values for 1979 and 1980 (inset box) are not included in the 1975–1980 "Total" or "Mean" values due to constraints on nest visits during the egg period in those years. Therefore, the data are not directly comparable to previous years with frequent nest visits.

Table 2. Causes of egg (E) and nestling (N) loss in accessible active Osprey nests in the primary study area, 1975–1980.

	1975		1976		1977		1978		1979		1980		Total	
	E	N	E	N	E	N	E	N	E	N	E	N	E	N
Disappeared between nest visits	70	14	92	19	63	29	107	34	3	7	17		352	103
Found as fragments in nest	74		45		37		41		5		3		205	
Cracked or broken	5								3		1		9	
Punctured or crushed	3		9		7		1		1		1		22	
No contents											2		2	
Addled	25		30		22		23		3		9		112	
Abandon			1						2				3	
Buried in nest material	6				2		2						10	
Beneath plastic bag used as nest material							1						1	
Found outside or beneath nest			1		3		1				3		8	
Predator	5		2		8		2						17	
Wind and/or wave action	1												1	
Destroyed by people					9	1					1		10	1
Found dead in nest				15		16				4				35
Found dead outside nest		1		2				3				1		7
Rain exposure fatality		1												1
Found tangled in monofilament fishing line				3										3
Female cannibalism								1						1
Deformed nestling collected for analysis				1						3				4
Nest site collapsed	4		3	2	8	5	6	6		2			21	15
Totals	**193**	**16**	**183**	**42**	**159**	**51**	**184**	**44**	**17**	**16**	**37**	**1**	**773**	**170**

In the northern reference area in Eastern Bay during 1975–1980, 75% (n = 175) of the active nests (n = 234) were accessible, 83% (n = 146) of accessible nests contained eggs, 61% (n = 107) contained nestlings, and 57% (n = 99) contained fledglings (Table 3). Observed eggs in 1975–1978 (1979–1980 are excluded due to fewer nest visits during the egg period than in 1975–1978) totaled 243 with 56% (n = 136) hatching and 51% (n = 125) fledging, while 92% of the nestlings fledged in 1975–1980. Eggs addled (n = 9), cracked or broken (n = 2), found as fragments in the nest (n = 33), and disappearing between nest visits (n = 57) constituted 89% of the losses (Table 4). Young found dead in (n = 3) or out (n = 2) of the nest and disappeared between nest visits (n = 7) accounted for 75% of the nestlings lost. The average number fledged per nest producing fledglings was 2.1 with 1.15 average number fledged per accessible active nest (Table 3).

Table 3. Success of accessible active Osprey nests in the adjoining north reference area in Eastern Bay, 1975–1980. () = %.

	1975	1976	1977	1978	1979	1980	Total*	Mean*
Total active nests found	37	33	35	34	45	50	234	39
Accessible active nests	29	27	23	23	36	37	175	29
	(78)	(82)	(66)	(68)	(80)	(74)	(75)	
Accessible nests with eggs	27	25	20	21	29	24	146	24
	(93)	(93)	(87)	(91)	(81)	(65)	(83)	
Accessible nests with nestlings	18	18	13	12	23	23	107	18
	(62)	(67)	(57)	(52)	(64)	(62)	(61)	
Accessible nests with fledglings	17	16	12	12	20	22	99	17
	(59)	(59)	(52)	(52)	(56)	(59)	(57)	
Total eggs known	66	68	57	52	41	43	243	61
Eggs per nest with eggs	2.4	2.7	2.9	2.5	1.4	1.8		2.6
Eggs hatching	37	40	32	27	36	42	136	34
	(56)	(59)	(56)	(52)	(88)	(98)	(56)	
Eggs fledging	35	35	29	26	33	40	125	31
	(53)	(51)	(51)	(50)	(80)	(93)	(51)	
Percent of nestlings fledged	(95)	(88)	(91)	(96)	(92)	(95)	(92)	
Average number fledged per nest producing fledglings	2.1	2.2	2.4	2.2	1.7	1.8		2.1
Average number fledged per accessible active nest	1.21	1.30	1.26	1.13	0.92	1.08		1.15

* Egg values for 1979 and 1980 (inset box) are not included in 1975–1980 "Total" or "Mean" values since a single nest visit late in the egg period missed detecting most eggs. Nests were visited during the early egg period in 1975–1978.

Table 4. Causes of egg (E) and nestling (N) loss in accessible active Osprey nests in the adjoining north reference area in Eastern Bay, 1975–1980.

	1975		1976		1977		1978		1979		1980		Total	
	E	N	E	N	E	N	E	N	E	N	E	N	E	N
Disappeared between nest visits	11	1	21	5	10		12		3	1			57	7
Found as fragments in nest	17				7		8		1				33	
Cracked or broken			1								1		2	
Addled	1		4		1		2		1				9	
Buried in nest material							3						3	
Found outside or beneath nest			2										2	
Predator					3								3	
Found dead in nest									2		1			3
Found dead outside nest		1						1						2
Nest site collapsed					4						1		4	1
Nestlings stolen for pets						3								3
Totals	**29**	**2**	**28**	**5**	**25**	**3**	**25**	**1**	**5**	**3**	**1**	**2**	**113**	**16**

The number of active nests in the study area increased significantly from 1975 to 1980, but not in the north reference area (study area: $R^2 = 0.82$, p=0.013; reference area: $R^2 = 0.60$, p=0.07, Figure 1). Comparing the 1975–1980 productivity between the study area and north reference area finds there was no difference in the average number of fledged per accessible active nest (p=0.15).

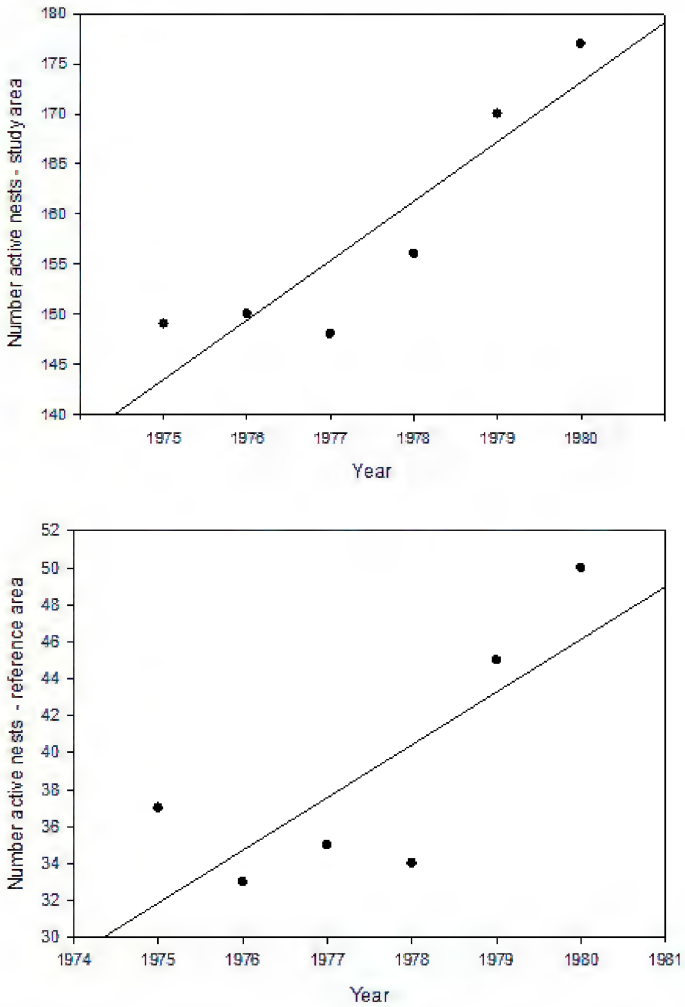

Figure 1. Number of active nests during 1975–1980 in the study area (top) and north reference area (bottom). Study area: ($R^2 = 0.82$, slope = -11593.667 + (5.943 * year), p=0.013); north reference area: ($R^2 = 0.60$, slope 1969.307 + (0.210 * year), p=0.07).

Regarding the southern reference area, the 1968–1971 results were published in Reese (1972) and the 1972–1979 results were published in Reese (1981). Only the 1980 results were previously not published and are summarized here. In 1980, the adjoining southern reference area in Choptank River had 41 active nests with 40 (98%) accessible. A total of 27 (68%) accessible nests contained eggs, 25 (63%) contained nestlings, and 24 (60%) contained fledglings. A total of 57 eggs were observed with 53 (93%) hatching and 52 (91%) fledgling, while 98% of the nestlings fledged. Causes of egg and nestling losses included four addled eggs and one nestling in a nest site that collapsed. The average number fledged per nest producing fledglings was 2.2 with 1.30 average number fledged per accessible active nest.

ANALYSES

Comparing 1975–1980 data in Table 1 with those collected from the study area in previous years, the mean number of active nests was 15% higher than the 1970–1974 mean (Reese 1977), and 46% higher than the 1963–1969 mean (Reese 1970), while the mean number of accessible active nests was 33% and 91% higher, respectively. The mean numbers were also higher for accessible active nests with eggs (31%, 68%), accessible active nests with nestlings (43%, 100%), and accessible active nests with fledglings (40%, 99%). The comparison data is not presented here since all comparisons have a p=0.001. There was no difference between periods in the percent of accessible nests with eggs (p=0.43); however, there was a difference in the percent with nestlings (mean % 54±3.7, 63±2.1, 68±2.7; p=0.015) and fledglings (mean % 50±3.7, 58±2.9, 61±1.8; p=0.036), for the periods 1963–1969 [Reese 1970], 1970–1974 [Reese 1977], and 1975–1980, respectively).

There was no difference in the percent of eggs hatching (p=0.28) and eggs fledging (p=0.87) between time periods since 1963, while the percent of nestlings fledged (86.4±1.8%) remained near previous periods (85.6±2.6% in 1970–1974 [Reese 1977], 85.4±1.9% in 1963–1969 [Reese 1970], p=0.91). Similarly, the average number fledged per nest producing fledglings (1.9) remained the same as in previous periods (p=0.97). There was also no difference between periods in the average number fledged per accessible active nest despite an annual increase over the previous period, i.e., 0.94±0.06 in 1963–1969 (Reese 1970), 1.13±0.09 in 1970–1974 (Reese 1977), and 1.17±0.06 in 1975–1980 (p=0.062).

In the northern reference area, there was no difference when comparing 1975–1980 with 1966–1974 (Reese 1975) for the average number fledged per nest producing fledglings (p=0.55) and the average number fledged per accessible active nest (p=0.07).

DISCUSSION

A long-term study of Osprey nest success within a specific area in central Chesapeake Bay began in 1963 and continued through 1980 with the 1975–1980 average number fledged per accessible active nest 1.17 despite 44% of the 1975–1980 known eggs (n = 1497) lost to addled, cracked, broken, punctured, crushed, found as fragments in the nest, or disappearing between nest visits (n = 654). A northern reference area of comparable-size showed a similar average number fledged per accessible active nest (1.15) in 1975–1980, while 1.30 fledged in a similar-sized southern reference area in 1980.

Study area increases over previous periods in the number of nests, plus the percent of nests with eggs, nests with nestlings, and nests with fledglings suggest rates of return and nest success has improved over previous periods of published study. Structural maintenance and/or replacement of damaged nest sites plus erection of new artificial nest structures may have contributed to retaining previous nesting pairs and provided for new pairs attracted to the area.

Constraints in the need and support for the study curtailed the 12–15-day nest visits in 1979–1980. With fewer nest visits came failure to detect most clutch sizes, disposition, and losses as in previous years of study. Thus, egg data for those two years is not directly comparable to that of previous years. Regardless, the 1975–1978 percent of eggs hatching (52%) was greater than previous periods (48% in 1970–1974 [Reese 1977] and 44% in 1963–1969 [Reese 1970]), despite 44% being addled, cracked, broken, punctured, crushed, found as fragments in the nest, or disappeared between nest visits (Table 2). Continuous improvement in the percent of eggs hatching during the 18 years (1963–1980) of nest monitoring suggest bans in the 1970s on organochlorine compounds use may be leading to declining residues of parent compounds of these pesticides in the environment, thus lessening their suppressive effect on female Osprey physiology, egg viability, and reproductive nest success. Increasing hatchability may be the most important factor contributing to the observed improvement in nest success.

Each period, the percent of nestlings fledged was 85–86%, while the average number fledged per nest producing fledglings (brood size) remained at 1.9 indicating little to no change in the rate of nestling mortality through the 18 years. However, seasonal mortality may vary, such as finding 31 young dead in the nest from unidentified causes in 1976–1977 (Table 2), plus adverse weather conditions in 1977.

The average number fledged per accessible active nest increased over the previous period throughout the 18 years. This suggests more eggs hatched in accessible active nests in the mid–late 1970s than in previous years of study,

potentially boosting population nest success. Osprey studies in tidewater areas ranging from the mouth of Chesapeake Bay north to Massachusetts Bay also found improving nest success in the mid–late 1970s (Henny et al. 1977, Spitzer and Poole 1980, Poole and Spitzer 1983). It also supports theories implicating organochlorine toxicity in egg loss during the laying and incubation period of some raptors and fish-eating birds. It was expected that bans on use of those compounds in the United States during the early–mid 1970s, with their subsequent decline in the environment, would contribute to improved nest success of affected species. Observed ongoing egg loss, however suggests it may take many years for the contaminant effects to abate significantly.

In the absence of actual reproductive data prior to the appearance of organochlorines in the mid-1940s, life tables have been created from New York and New Jersey recoveries of Ospreys banded as nestlings in 1926–1961 (Henny and Wight 1969). Assuming the species begins to breed at age-three, these data demonstrate each female must produce between 0.95–1.30 fledglings to balance mortality and maintain a stable population (Henny and Wight 1969, Henny et al. 1970). Osprey nesting studies in tidewater areas of eastern Long Island Sound continuing east and north to Massachusetts Bay demonstrated productivity of 0.80 fledglings per nest in the 1970s (Poole and Spitzer 1983, Spitzer et al. 1983). In 1963–1980, the annual average number fledged per accessible active nest in this Chesapeake Bay study area ranged 0.87–1.43 with the exception of 1963 when it was 0.64 (Reese 1970, 1977). This suggests nearly every year Osprey nest success in the study area has been within the estimated productivity range necessary to maintain population stability.

In the north adjoining reference area in 1975–1980, increases over 1966–1974 (Reese 1975) occurred in the percent of nests with fledglings (24%) and the average number fledged per accessible active nest (37%). Improvement in the 1975–1980 nest success in the north reference area similar to that of the primary study area suggests frequent nest visits in the primary area had no discernable influence on productivity.

In the southern reference area in Choptank River, comparisons of the single year 1980 nest success with previous years of published results are mixed. The percent of nests with fledglings was 10% lower than in 1972–1979 (66%) (Reese 1981), but up 115% over 1968–1971 (52%) (Reese 1972), while the average number fledged per accessible active nest was unchanged from 1972–1979 (1.3) but up 37% over 1968–1971 (0.95). These data were not statistically compared, since comparing a single year to that of previous multiyear means may be misleading.

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LITERATURE CITED

Ames, P.L., and G.S. Mersereau. 1964. Some factors in the decline of the Osprey in Connecticut. *The Auk* 81(2):173–185.

Broley, C.L. 1958. The plight of the American Bald Eagle. *Audubon Magazine* 60(4):162–163, 171.

Carson, R. 1962. *Silent Spring*. Houghton Mifflin, Boston, MA. 368 pp.

Dunstan, T.C. 1968. Breeding success of Osprey in Minnesota from 1963 to 1968. *The Loon* 40(4):109–112.

Greene, E., and B. Freedman. 1986. Status of the Osprey, *Pandion haliaetus*, in Halifax and Lunenburg Counties, Nova Scotia. *The Canadian Field-Naturalist* 100(4):470–473.

Henny, C.J., and H.M. Wight. 1969. An endangered Osprey population: estimates of mortality and production. *The Auk* 86(2):188–198.

Henny, C.J., W.S. Overton, and H.M. Wight. 1970. Determining parameters for populations using structural models. *The Journal of Wildlife Management* 34(4):690–703.

Henny, C.J., M.A. Byrd, J.A. Jacobs, P.D. McLain, M.R. Todd, and B.F. Halla. 1977. Mid-Atlantic Coast Osprey population: present numbers, productivity, pollutant contamination, and status. *The Journal of Wildlife Management* 41(2):254–265.

Hickey, J.J. (Editor). 1969. *Peregrine Falcon populations: their biology and decline*. The University of Wisconsin Press, Madison, WI. 596 pp.

Hickey, J.J., and D.W. Anderson. 1968. Chlorinated hydrocarbons and eggshell changes in raptorial and fish-eating birds. *Science* 162(3850):271–273.

MacCarter, D.L., and D.S. MacCarter. 1979. Ten-year nesting status of Ospreys at Flathead Lake, Montana. *The Murrelet* 60(2):42–49.

Peakall, D.B. 1967. Pesticide-induced enzyme breakdown of steroids in birds. *Nature* 216(5114):505–506.

Peakall, D.B. 1969. Effect of DDT on calcium uptake and vitamin D metabolism in birds. *Nature* 224(5225):1219–1220.

Poole, A.F., and P.R. Spitzer. 1983. An Osprey revival. *Oceanus* 26(1):49–54.

Prevost, Y.A., R.P. Bancroft, and N.R. Seymour. 1978. Status of the Osprey in Antigonish County, Nova Scotia. *The Canadian Field-Naturalist* 92(3):294–297.

Ratcliffe, D.A. 1958. Broken eggs in Peregrine eyries. *British Birds* 51(1):23–26.

Ratcliffe, D.A. 1963. The status of the Peregrine in Great Britain. *Bird Study* 10(2):56–90.

Ratcliffe, D.A. 1967. Decrease in eggshell weight in certain birds of prey. *Nature* 215(5097):208–210.

Reese, J.G. 1970. Reproduction in a Chesapeake Bay Osprey population. *The Auk* 87(4):747–759.

Reese, J.G. 1972. Osprey nesting success along the Choptank River, Maryland. *Chesapeake Science* 13(3):233–235.

Reese, J.G. 1975. Osprey nest success in Eastern Bay, Maryland. *Chesapeake Science* 16(1):56–61.

Reese, J.G. 1977. Reproductive success of Ospreys in central Chesapeake Bay. *The Auk* 94(2):202–221.

Reese, J.G. 1981. Osprey reproductive success along Choptank River, Maryland. *Estuaries* 4(4):369–373.

Singer, F.J. 1974. Status of the Osprey, Bald Eagle, and Golden Eagle in the Adirondacks. *New York Fish and Game Journal* 21(1):18–31.

Spitzer, P., and A. Poole. 1980. Coastal Ospreys between New York City and Boston: a decade of reproductive recovery 1969–1979. *American Birds* 34(3):234–241.

Spitzer, P.R., A.F. Poole, and M. Scheibel. 1983. Initial recovery of breeding Ospreys in the region between New York City and Boston. Pages 231–241 in: D.M. Bird (Chief Editor), *Biology and Management of Bald Eagles and Ospreys: Proceedings of First International Symposium on Bald Eagles and Ospreys, Montreal, 28–29 October, 1981.* Harpell Press, Sainte-Anne-de-Bellevue, Quebec, Canada. 325 pp.

Swenson, J.E. 1979. Factors affecting status and reproduction of Ospreys in Yellowstone National Park. *The Journal of Wildlife Management* 43(3):595–601.

United States Forest Service. 1974. Bald Eagle-Osprey status report U.S. Forest Service, Eastern Region—1973. *The Passenger Pigeon* 36(1):16–18.

Maryland Birdlife 68(1):58

Maryland Christmas Bird Counts (118th CBC) December 2017 through January 2018: Corrigendum

Table 2 of the Maryland Christmas Bird Counts (118th CBC): December 2017 through January 2018 article (Churchill 2018) showed incorrect values for the Chesterville Christmas Bird Count "Participants" and "Species" due to transposition of the two numbers. The corrected data line in Table 2 should read as follows:

Christmas Bird Count	Survey Date	Participants	Total Party Hours	Species
Chesterville	31 Dec 2017	20	89.55	96

LITERATURE CITED

Churchill, J.B. 2018. Maryland Christmas Bird Counts (118th CBC) December 2017 through January 2018. *Maryland Birdlife* 67(2):52–72.

Maryland Birdlife 68(1):59–72

2018 Maryland May Count

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The annual May Count was held on Saturday, 12 May 2018, except the Talbot County count was conducted on Sunday, 13 May, in order to provide adequate coverage for both that county and Dorchester County. Results were submitted from 21 of Maryland's 23 counties (Table 1).

Table 1. 2018 Maryland May Count: participating counties, county codes, and compilers. (The dashed line separates the Western and Eastern Shore counts.)

County	Code	Compiler
Garrett	GA	Nadine Jakubowski
Allegany	AL	J.B. Churchill
Washington	WA	Mark Abdy
Frederick	FR	David Smith
Montgomery	MO	Diane Ford
Carroll	CA	Don Jewell
Howard	HO	Kevin Heffernan
Baltimore	BA	Peter Lev, Kevin Graff, and Debbie Terry
Prince George's	PG	Fred Fallon
Anne Arundel	AA	Dotty Mumford
Charles	CH	Lynne Wheeler
Calvert	CT	Sherman Suter
St. Mary's	SM	J. Tyler Bell
Cecil	CE	Richard Donham
Kent	KE	Walter Ellison
Talbot	TA	David Palmer
Dorchester	DO	Harry Armistead
Caroline	CN	Debby Bennett
Wicomico	WI	Ellen Lawler
Worcester	WO	Marcia Balestri
Somerset	SO	Paul Bystrak

Weather for the 2018 count was seasonable with no major impacts. A low of 51 °F (10.6 °C) was reported in Washington County; most lows were in the low 60s °F (15.6–17.2 °C). Highs were primarily in the 80s °F (26.7–31.7 °C), ranging from 78 °F (25.6 °C) in Garrett County to 92 °F (33.3 °C) in Wicomico County. Skies were partly cloudy to clear, with showers or thunderstorms reported late in the day from Dorchester, Kent, St. Mary's, and Garrett Counties. Winds were mostly light and variable all day with some increased breeziness toward dusk.

A total of 403 counters in 273 parties reported 241 species and 120,262 total birds (Tables 2 and 3). Total numbers of birds were up over 10% from last year, when unseasonably cool, rainy weather prevailed. Among the notable sightings were 95 Blue-winged Teal (all in Prince George's, primarily at Beltsville Agricultural Research Center and Patuxent Wildlife Research Center); 90 Eastern Whip-poor-will (63 in Anne Arundel, small numbers in Garrett, Allegany, Washington, Charles, St. Mary's, Dorchester, Caroline, Wicomico, and Worcester); 2445 Black-bellied Plover (173 in Kent, 36 in Dorchester, 70 in Caroline, 2164 in Worcester, and 2 in Somerset); 2127 Dunlin (2 in Anne Arundel, 1 in Kent, 9 in Talbot, 778 in Dorchester, 324 in Worcester, and 1014 in Somerset); 630 Lesser Yellowlegs (25 in Howard, 28 in Anne Arundel, 11 in Talbot, 44 in Dorchester, 404 in Worcester, and 88 in Somerset, and smaller numbers in Washington, Frederick, Baltimore, Prince George's, Calvert, St. Mary's, Kent, and Caroline); smaller numbers of most gulls (especially Ring-billed Gull) than on previous counts; 244 Snowy Egret (9 in Anne Arundel, 14 in Calvert, 1 in Kent, 8 in Talbot, 47 in Dorchester, 1 in Wicomico, 101 in Worcester, and 63 in Somerset); 105 Red-headed Woodpecker (11 in Garrett, 19 in Frederick, 12 in Carroll, 30 in Dorchester, and smaller numbers in most other counties [regarding Dorchester, Harry Armistead commented that the countless thousands of loblolly pines killed by saltwater intrusion over the past few years have resulted in an increase in Red-headed Woodpecker numbers]); high numbers of several flycatcher species (1239 Great Crested Flycatcher, 1013 Eastern Wood-Pewee, and 869 Acadian Flycatcher); 72 Bay-breasted Warbler (29 in Garrett, 9 in Howard, 12 in Baltimore, and smaller numbers in Washington, Frederick, Montgomery, Carroll, Prince George's, Anne Arundel, Charles, St. Mary's, Cecil, and Dorchester); and 12 Dickcissel (2 in Frederick, 4 in Carroll, 2 in Howard, and 4 in Caroline). (Tables 4 and 5).

Misses included American Wigeon, Green-winged Teal, Canvasback, Black Scoter, Horned Grebe, Red-necked Grebe, Purple Sandpiper, Black Tern, Northern Gannet, Olive-sided Flycatcher, Sedge Wren, and Henslow's Sparrow.

Not included in the tables are the results of bird banding carried out on count day at the Audrey Carroll Audubon Sanctuary in Frederick County: 4 Downy Woodpecker, 2 Hairy Woodpecker, 1 Traill's Flycatcher, 1 Tufted Titmouse, 5 Carolina Wren, 1 Veery, 16 Gray Catbird, 2 American Goldfinch, 1 Eastern Towhee, 2 Yellow-breasted Chat, 1 Ovenbird, 3 Northern Waterthrush, 1 Mourning Warbler, 4 Common Yellowthroat, 1 Northern Cardinal, and 2 Indigo Bunting.

Also not included are the following "night flight call" birds reported from Howard County: 1 Yellow-billed Cuckoo, 1 Black-billed Cuckoo, 1 Common Nighthawk, 1 Least Sandpiper, 1 Great Blue Heron, 1 Green Heron, 1 Barred Owl, 1 Alder Flycatcher, 1 Veery, 1 Gray-cheeked Thrush, 1 Swainson's Thrush, 1 Common Yellowthroat, 1 Canada Warbler, and 1 Rose-breasted Grosbeak.

All in all, 2018 was a better year than 2017, both in terms of numbers of birds and weather.

Table 2. 2018 Maryland May Count: Western Shore summary.

	GA	AL	WA	FR	MO	CA	HO	BA	PG	AA	CH	CA	SM
Parties	13	6	12	13	6	12	51	41	22	21	12	7	9
Observers	18	7	23	19	6	21	76	52	36	31	19	16	16
Start time	525	515	430	400	700	530	554		430	500	400	450	300
Stop time	2030	1915	1830	1830	1600	2000	2030		2000	2000	2030	2030	1745
Driving													
hours	45.5	29	44	52.25		23	35.4	5	24	11.25	29.15	7.39	14
miles	443	140	279	488.5		320	295.5	6.5	155.7	71	287	36.5	193.5
Walking													
hours	64.25	20.25	26.5	29.7	5	63.7	183.5	74.35	69.9	71.5	25.6	36.92	18.75
miles	32.45	13.05	16.6	23.4	4	54.4	156.5	42.7	61.6	56.7	28	30.91	19.75
Other	tractor, ATV, bicycle									golf cart, boat	bicycle		
hours	4					3				3.5	5.5		
miles	20.25									5	8.5		
Owling													
hours			1	1.25			1.5		1		3	1.38	3
miles			3	16.5			1.5		5.5		16	12.43	60
Stationary													
hours		0.5	6	8		12.25	1.1		2.5	14.5	24	6.21	12.8
Total species	150	110	131	141	89	133	134	142	156	159	119	134	128
Total individuals	5942	2123	4478	9263	560	6884	13,500	5978	8888	8418	5070	5109	4351

Table 3. 2018 Maryland May Count: Eastern Shore and total count summaries.

	CE	KE	TA	DO	CN	WI	WO	SO	Total
Parties	3	2	7	6	12	9	4	5	273
Observers	4	5	10	8	17	11	5	3	403
Start Time	700	552	430	300		450	430	615	
Stop Time	1430	2020	2100	2100		1950	1923	2045	
Driving									
hours		10.5	36.5	22	36	8.25	30.5	1	464.69
miles		70	216	242	367	135	233	19.59	3998.79
Walking									
hours	17.5	10	40	33	30	20.25		1	841.67
miles	10.3	12.6	15	20	18	12.75		1	629.71
Other									
hours									16
miles									33.75
Owling									
hours			4.5		4.5	0.5	0.5		22.13
miles			40		38	1.5	3.4		194.83
Stationary									
hours	0.5		10		9	12.75		11.7	131.81
Total species	102	125	135	156	127	99	133	101	241
Total individuals	827	3481	4896	9544	6191	2242	8765	3752	120,262

Table 4. 2018 Maryland May Count: Western Shore observed species.

Species	GA	AL	WA	FR	MO	CA	HO	BA	PG	AA	CH	CT	SM
Canada Goose	186	53	148	177	13	321	625	160	306	279	113	52	71
Tundra Swan	2									1			
Wood Duck	50	20	24	15	6	10	43	31	38	25	28	17	3
Blue-winged Teal									95				
Gadwall								2					
Mallard	31	17	21	75	4	33	55	73	16	119	85	130	20
American Black Duck									50	1			
Northern Pintail								1	2				
Greater Scaup										1			
Lesser Scaup										1			
Surf Scoter										1			
Long-tailed Duck										10			
Bufflehead	1	1		1						2			
Hooded Merganser	2	2	1	1	7		4			5			
Common Merganser			2	6					12				
Red-breasted Merganser		3											
Ruddy Duck	1											2	1
Northern Bobwhite		1											
Ring-necked Pheasant	1												

Species	GA	AL	WA	FR	MO	CA	HO	BA	PG	AA	CH	CT	SM
Ruffed Grouse	4												
Wild Turkey	33	1	11	8		3		1	15	3	28	7	8
Pied-billed Grebe									3				
Rock Pigeon	44	43	75	88		44	16	40	56	41		1	4
Mourning Dove	96	43	80	254	7	149	314	121	221	187	85	96	71
Yellow-billed Cuckoo	4	9	11	7		8	11	4	27	19	5	9	9
Black-billed Cuckoo	2	2	5	2			2	3					
Common Nighthawk						4	2	5	4	5	2		
Eastern Whip-poor-will	1	2	7							63	2		5
Chimney Swift	26	62	46	149	4	74	108	110	89		69	36	35
Ruby-throated Hummingbird	43	2	8	15	1	22	15	29	13	12	16	14	10
Clapper Rail													1
Virginia Rail						1			1			1	
Sora									4				
American Coot	1						1			1			
Sandhill Crane	3												
Semipalmated Plover				1						6		5	6
Killdeer	18	2	4	22	2	7	19	4	10	9	9		13
Upland Sandpiper	2												
Stilt Sandpiper				1									
Dunlin										2			
Least Sandpiper	8			5			3		21	231		56	1
White-rumped Sandpiper										1			
Semipalmated Sandpiper						13				74		3	31
sandpiper sp.									6			6	
Short-billed Dowitcher												1	
American Woodcock	3								1				3
Spotted Sandpiper	24	4	5	14		7	17	9	13	43	6	17	4
Solitary Sandpiper	1	1	4	3	2	3	23	9	17	6		1	
Lesser Yellowlegs			1	8			25	1	3	28		7	1
Greater Yellowlegs								1	7	4	2	1	2
Laughing Gull									43	134	5	20	70
Ring-billed Gull						2		12	5	23	9	22	31
Herring Gull								4	1	81	18	6	26
Lesser Black-backed Gull										1			
Great Black-backed Gull								3		73		11	5
gull sp.									15	10			
Least Tern								19		11		1	
Caspian Tern								2	1	9			
Common Tern										9			
Forster's Tern	8								5	11		10	2
Royal Tern										2	15	74	2
Red-throated Loon										1			
Common Loon	4					3				2	2		5
Double-crested Cormorant	5	5	7	5	1	1	38	56	130	335	104	13	349
Brown Pelican													10

Species	GA	AL	WA	FR	MO	CA	HO	BA	PG	AA	CH	CT	SM
American Bittern								1	1				
Least Bittern								1	2				
Great Blue Heron	6		10	17		9	34	23	68	44	42	11	59
Great Egret	4			3	1			1	10	14	1	2	5
Snowy Egret										9		14	
Little Blue Heron								1		5			
Cattle Egret									1	8			
Green Heron	1	2	14	4	2	5	33	6	15	30	4	3	8
Black-crowned Night-Heron				10					1				
Yellow-crowned Night-Heron				1		2							
Glossy Ibis							1			2			
Black Vulture	1	2	19	79	1	77	103	40	101	89	105	21	48
Turkey Vulture	110	66	88	139	3	120	184	98	127	118	99	54	64
Osprey	3		2	1		3	6	29	80	144	165	88	94
Northern Harrier			1	3					1	6		1	
Sharp-shinned Hawk	1	2	2			1			1	7	1		1
Cooper's Hawk		1		7		5	10		3	11	1	2	1
Bald Eagle	1	1	2	1		3	3	7	20	22	48	12	8
Mississippi Kite						1							
Red-shouldered Hawk	6	1	7	21	1	17	64	31	18	9	8	4	5
Broad-winged Hawk	8	1	3	1		1	4	1		17			
Red-tailed Hawk	11	3	10	38		22	20	21	15	16	6	1	
Barn Owl											11	1	
Eastern Screech-Owl	1					1	2					1	
Great Horned Owl									2	3		1	
Barred Owl	3		4	4		4	8	1	5	9	7	11	
Belted Kingfisher	1		3	5	2	4	14	5	9	6	2	3	2
Red-headed Woodpecker	11		1	19		12	3	3	1	2	8	6	4
Red-bellied Woodpecker	58	30	66	128	6	131	268	86	108	107	88	74	32
Yellow-bellied Sapsucker	1		1										
Downy Woodpecker	32	12	22	55	5	51	96	43	40	37	16	24	5
Hairy Woodpecker	25	9	6	11	1	12	23	13	8	9	8	13	5
Northern Flicker	35	13	10	19	1	16	48	17	22	20	2	5	6
Pileated Woodpecker	13	10	13	21	4	14	55	14	23	19	19	22	7
woodpecker sp.												1	
American Kestrel	1		1	8		4		4	12		1		1
Merlin										4		1	
Peregrine Falcon							1						
Great Crested Flycatcher	12	4	62	119	9	60	129	51	79	73	62	60	51
Eastern Kingbird	22	3	44	116	2	69	97	55	80	54	26	32	26
Eastern Wood-Pewee	7	11	57	139	8	67	172	56	87	39	55	85	36
Acadian Flycatcher	2	1	34	46	6	56	129	41	139	42	69	128	36
Alder Flycatcher	4					1			1				
Willow Flycatcher	6		1	5	1	4	3	1	1				
Least Flycatcher	23	2		1			2	4	3		1	1	
Empidonax sp.				3	1	1							

Species	GA	AL	WA	FR	MO	CA	HO	BA	PG	AA	CH	CT	SM
Eastern Phoebe	29	13	24	27	2	22	54	19	25	19	17	21	6
White-eyed Vireo	7	1	1	11	5	28	36	12	85	26	38	49	32
Yellow-throated Vireo	1	5	2	12	4	17	20	13	27	8	27	19	2
Blue-headed Vireo	46	1		2		1	6	5	1	7			1
Philadelphia Vireo	1												
Warbling Vireo		9	34	63	1	12	26	18	5	1	1	2	
Red-eyed Vireo	222	81	108	181	11	171	355	177	288	131	185	226	72
Blue Jay	91	40	59	137	7	128	395	120	85	271	52	61	51
American Crow	199	33	93	135	8	268	315	114	98	162	108	67	101
Fish Crow			10	51	1	73	82	21	34	55	32	37	31
crow sp.				66					9			24	2
Common Raven	31	6	5	5	1		9	5	2				
Horned Lark			17	26		8	17	1	17	2		5	4
Purple Martin	7		4	101		36	52	1	18	44	192	36	88
Tree Swallow	83	14	33	97	13	27	123	106	203	97	36	13	45
N. Rough-winged Swallow	19	20	24	34		10	30	30	14	36	5	5	7
Bank Swallow	9							2	15				
Cliff Swallow	42	50	109	18		57	61						
Barn Swallow	171	14	79	198	6	184	244	66	159	139	116	125	61
Carolina Chickadee			62	86	10	88	226	101	79	132	65	74	62
Black-capped Chickadee	122	15	16										
Tufted Titmouse	61	43	127	111	7	111	378	113	121	128	119	161	102
Red-breasted Nuthatch	4				2								
White-breasted Nuthatch	41	28	15	32	3	42	103	36	37	23	12	20	6
Brown-headed Nuthatch												4	8
Brown Creeper	9		2	1							1		
House Wren	58	5	24	79	6	105	126	65	12	33	5	4	1
Winter Wren	2		1										
Marsh Wren							1	2	9	1	6	5	1
Carolina Wren	20	44	112	256	15	120	299	103	172	112	107	135	78
Blue-gray Gnatcatcher	17	17	40	108	21	104	211	140	168	112	89	85	28
Golden-crowned Kinglet	3	3											
Ruby-crowned Kinglet	1			1				2					
Eastern Bluebird	31	12	172	101	8	73	203	34	127	62	54	55	40
Veery	5		1	1		10	13	9	3	4		7	
Gray-cheeked Thrush			1	2			1		4	2			1
Swainson's Thrush	3		2	4	6	8	16	22	45	9	13	12	3
Hermit Thrush	12		3			1			1				
Wood Thrush	22	18	27	130	4	132	216	75	138	39	43	103	33
American Robin	334	155	173	377	10	155	474	281	161	292	83	74	87
Gray Catbird	151	63	83	288	22	448	505	208	87	108	16	52	18
Brown Thrasher	37	5	16	37	2	29	29	4	34	34	37	21	45
Northern Mockingbird	1	12	56	140	3	73	143	43	82	97	64	46	53
European Starling	127	132	334	793	3	364	524	267	552	323	217	167	176
Cedar Waxwing	19	4	78	81	59	94	359	124	264	125	102	14	39
House Sparrow	51	61	61	262	8	138	196	147	55	108	81	106	84

Species	GA	AL	WA	FR	MO	CA	HO	BA	PG	AA	CH	CT	SM
American Pipit						4							
House Finch	9	19	48	119	2	68	182	94	65	130	44	59	42
Purple Finch	22												
Pine Siskin	21												
American Goldfinch	207	64	120	224	13	154	309	199	104	222	31	97	49
Eastern Towhee	177	29	54	65	5	67	164	18	50	46	17	29	14
Chipping Sparrow	133	38	96	214	1	148	297	89	137	69	119	111	135
Field Sparrow	44	10	75	102	6	67	58	19	18	15	11	11	4
Vesper Sparrow			1	9									
Savannah Sparrow	8					2	27	2	14	3		5	3
Grasshopper Sparrow	7		28	53		1	28	2	13	7	2	11	45
Song Sparrow	169	48	60	160	3	94	174	37	30	91	8	53	18
Lincoln's Sparrow	1							1	1				
Swamp Sparrow	40		1	1	1	3	2	7	10	13		4	2
White-throated Sparrow	1			7	1	25	26	48	14	15	3	2	1
White-crowned Sparrow	2					1	2						
Dark-eyed Junco	3												
Yellow-breasted Chat	2	5	8	9	2	6	8	5	9	13	8	7	23
Bobolink	51			25		34	74	3	306	296	15		10
Eastern Meadowlark	21	2	18	57		11	9	1	29	4	10	4	29
Orchard Oriole	3	11	22	27	5	13	56	19	35	28	31	23	27
Baltimore Oriole	125	5	105	67	3	66	143	58	27	14	2	4	
Red-winged Blackbird	421	94	54	530	26	278	545	207	726	495	213	317	242
Brown-headed Cowbird	37	20	76	133	8	80	157	89	122	68	63	106	38
Rusty Blackbird		6								1	28		
blackbird sp.									30		1		
Common Grackle	104	83	222	389	3	130	160	93	222	212	170	182	293
Ovenbird	106	30	39	36	8	75	176	79	133	26	59	51	45
Worm-eating Warbler	1	5	11	2	2	10	11	7	2	2	6	19	3
Louisiana Waterthrush	3	3	9	12	2	17	53	21	13	4	21	15	8
Northern Waterthrush	14	5	1	6	2	2	7	7	10	5		1	
Golden-winged Warbler									1				
Blue-winged Warbler	1		11	2		3	1	1	1	3			
Black-and-white Warbler	25	5	20	6		20	29	22	23	19	26	14	9
Prothonotary Warbler			4	3	2		3		21	18	14	2	
Tennessee Warbler	5	6	3	5			2	9		1			
Nashville Warbler	1		2				1	2	1	1			
Mourning Warbler	1			1		1			2				
Kentucky Warbler	2	2	2	1	4	5	3	1	4		9	10	7
Common Yellowthroat	215	23	33	84	37	135	318	171	125	176	76	128	90
Hooded Warbler	13	5	5	3		3		5	18	11	44	54	3
American Redstart	81	18	18	45	1	51	93	87	82	48	23	22	16
Cape May Warbler		1	2	1	1		2	2	1	1	3		1
Cerulean Warbler	10	3	8	1			1	1				1	
Northern Parula	27	5	12	38	5	50	149	62	89	48	98	82	20
Magnolia Warbler	22	15	3	7		11	29	39	16	10		1	3

Species	GA	AL	WA	FR	MO	CA	HO	BA	PG	AA	CH	CT	SM
Bay-breasted Warbler	29		4	2	1	5	9	12	5	1	1		1
Blackburnian Warbler	1	2		5			1	5	1				1
Yellow Warbler	90	11	23	32	2	19	77	31	15	19	7	3	8
Chestnut-sided Warbler	129	8	4	5	1	4	11	4	7	2		1	2
Blackpoll Warbler	1	2	6	45	3	15	96	62	34	20	12	22	28
Black-throated Blue Warbler	43	4	7	11	1	32	35	27	24	11	3	16	2
Palm Warbler		1	1			1		1		2			
Pine Warbler		2	1	2		1	9	9	15	12	20	17	25
Yellow-rumped Warbler	18		17	17		15	45	19	17	36	3		3
Yellow-throated Warbler		1	1	1		1	2	4	3	3	22	36	9
Prairie Warbler	1	5	35	6	2	15	22	18	12	21	16	5	15
Black-throated Green Warbler	66	10	8	14		13	9	16	4	4			1
Canada Warbler	7		2	2		12	21	25	15	4	1	3	
Wilson's Warbler	1	3		1	1	2	2	11	2	6			
Summer Tanager								1	20	4	24	63	24
Scarlet Tanager	84	34	13	51	6	47	105	52	99	27	53	37	26
Northern Cardinal	91	77	138	449	30	347	811	261	300	391	206	209	185
Rose-breasted Grosbeak	67	4	12	10		6	7	5	6	4	1	4	
Blue Grosbeak			6	7		1	11	6	40	17	18	23	43
Indigo Bunting	77	48	78	221	21	94	245	62	215	120	147	108	117
Dickcissel				2		4	2						

Table 5. 2018 Maryland May Count: Eastern Shore and total observed species.

Species	CE	KE	TA	DO	CN	WI	WO	SO	Total
Canada Goose	22	16	219	151	166	123	100	14	3315
Mute Swan									1
Tundra Swan									3
Wood Duck	3	12	19	26	22	3	3		398
Blue-winged Teal									95
Northern Shoveler			1						1
Gadwall							1		3
Mallard	12	22	194	130	39	18	64	13	1171
American Black Duck				23		1	3	8	86
Northern Pintail									3
Ring-necked Duck							2		2
Greater Scaup		1							2
Lesser Scaup									1
Surf Scoter			3	3					7
Long-tailed Duck									10
Bufflehead									5
Hooded Merganser									22
Common Merganser									20

Species	CE	KE	TA	DO	CN	WI	WO	SO	Total
Red-breasted Merganser			4	1			1		9
Ruddy Duck				56					60
Northern Bobwhite			3	3	5		1		13
Ring-necked Pheasant									1
Ruffed Grouse									4
Wild Turkey		10	11	15	36	4	9		203
Pied-billed Grebe									3
Rock Pigeon	1	6	14	10	70		8	55	616
Mourning Dove	13	31	90	75	153	44	12	5	2147
Yellow-billed Cuckoo	2	7	5	11	5	6	5	1	165
Black-billed Cuckoo			1			2			19
Common Nighthawk									22
Chuck-will's-widow			7	32	1	4	4	4	63
Eastern Whip-poor-will				3	2	4	1		90
Chimney Swift	13	52	77	45	236	5	18	12	1266
Ruby-throated Hummingbird	3	12	7	11	25	4	11	3	276
Clapper Rail				14		3	2		20
King Rail				2					2
Virginia Rail		3	6	49				4	65
Sora			2						6
Common Gallinule				4				1	5
American Coot							1		4
Sandhill Crane									3
Black-necked Stilt				4					4
American Oystercatcher				1			4		5
Black-bellied Plover		173		36	70		2164	2	2445
Semipalmated Plover		42	32	114	12		80	33	331
Killdeer		4	27	11	32	6	4		203
Upland Sandpiper									2
Ruddy Turnstone		1		9			29	3	42
Stilt Sandpiper							2		3
Sanderling				7					7
Dunlin		1	9	778			324	1014	2128
Least Sandpiper		48	74	359	33		8	86	933
White-rumped Sandpiper							2	2	5
Pectoral Sandpiper				1					1
Semipalmated Sandpiper		8	4	114			2003	592	2842
sandpiper sp.							1060	716	1788
Short-billed Dowitcher			9				12	6	28
American Woodcock					2				9
Wilson's Snipe					6				6
Spotted Sandpiper	2	2	3	14	7		8	1	200
Solitary Sandpiper			1	4	1			1	77
Lesser Yellowlegs		7	11	44	2		404	88	630
Willet			3	21			13	21	58
Greater Yellowlegs		3	13	28	5		5	44	115
yellowlegs sp.								35	35

Species	CE	KE	TA	DO	CN	WI	WO	SO	Total
Bonaparte's Gull				4	2		21		27
Laughing Gull		11	136	1018	432	61	221	102	2253
Ring-billed Gull	1	7	10	26	61		3		212
Herring Gull			23	141	4		54	11	369
Lesser Black-backed Gull							2		3
Great Black-backed Gull		1	12	42			6		153
gull sp.						107			132
Least Tern			9	5			7		52
Caspian Tern				2				2	16
Common Tern				5	1		12		27
Forster's Tern		4	27	66	2	18	8	22	183
Royal Tern				16		25	110	7	251
Black Skimmer							20		20
Red-throated Loon									1
Common Loon		3	2	2	1				24
Double-crested Cormorant		112	115	558	20	15	102	14	1985
American White Pelican				1					1
Brown Pelican				55					65
American Bittern									2
Least Bittern				1					4
Great Blue Heron	9	19	47	97	32	47	2	12	588
Great Egret	1	1	11	83		2	27	49	215
Snowy Egret		1	8	47		1	101	63	244
Little Blue Heron				1			9	1	17
Tricolored Heron				3			13	2	18
Cattle Egret			35	6			6		56
Green Heron	3	2	18	16	11	2	6		185
Black-crowned Night-Heron				1			4		16
Yellow-crowned Night-Heron									3
White Ibis							1		1
Glossy Ibis			20		2		55	3	83
White-faced Ibis							1	1	2
Black Vulture	5	37	9	14	38	2	8	9	808
Turkey Vulture	9	112	87	177	171	64	112	20	2022
Osprey	4	65	124	133	35	27	5	7	1015
Northern Harrier		1		1				1	15
Sharp-shinned Hawk	1		4						21
Cooper's Hawk	1	1	1	1	2	1			48
Bald Eagle	1	28	40	84	22	9	11	12	335
Mississippi Kite									1
Red-shouldered Hawk	1	2		2	9		3		209
Broad-winged Hawk						1			37
Red-tailed Hawk		10	8	4	10	1		2	198
Barn Owl									12
Eastern Screech-Owl			5	10	2	1			23
Great Horned Owl			3	5	4				18
Barred Owl		5	4		10	2			77

Species	CE	KE	TA	DO	CN	WI	WO	SO	Total
Belted Kingfisher	3		2	1	2	1			65
Red-headed Woodpecker	1			30			4		105
Red-bellied Woodpecker	19	37	26	27	54	28	10	2	1385
Yellow-bellied Sapsucker									2
Downy Woodpecker	4	12	13	15	13	9	5		509
Hairy Woodpecker	2	4	3	4	9		1		166
Northern Flicker	1	6	2	15	3	1	1	1	244
Pileated Woodpecker	2	10	12	11	17	3	2		291
woodpecker sp.									1
American Kestrel			1	2	3	1			39
Merlin									5
Peregrine Falcon									1
Great Crested Flycatcher	5	51	63	137	87	63	44	18	1239
Eastern Kingbird	9	25	21	69	32	12	12	7	813
Eastern Wood-Pewee	8	59	20	15	50	10	23	9	1013
Acadian Flycatcher	9	51	6	11	25	11	25	2	869
Alder Flycatcher									6
Willow Flycatcher									22
Least Flycatcher									37
Empidonax sp.									5
Eastern Phoebe	7	4	3		13	2	2		309
White-eyed Vireo	2	16	10	26	22	16	37	11	471
Yellow-throated Vireo		3	2	4	2		8		176
Blue-headed Vireo	2								72
Philadelphia Vireo			1	1					3
Warbling Vireo	5	5							182
Red-eyed Vireo	19	116	29	46	72	22	42	8	2562
Blue Jay	8	34	39	42	49	18	5		1692
American Crow	11	16	99	120	95	45	5	12	2104
Fish Crow	2	13	11	23	17	8	45		546
crow sp.		5	5			15	15	2	143
Common Raven									64
Horned Lark		2	20	11	72	5	3		210
Purple Martin		43	100	328	182	85	66	4	1387
Tree Swallow	1	19	57	160	39	1	9	13	1189
N. Rough-winged Swallow	2	1	5	1	14		1		258
Bank Swallow				15					41
Cliff Swallow			4	3	6				350
Barn Swallow	17	50	188	347	271	60	58	12	2565
swallow sp.						14			14
Carolina Chickadee	7	35	29	44	52	21	16	14	1203
Black-capped Chickadee									153
Tufted Titmouse	14	32	35	85	83	43	39	11	1924
Red-breasted Nuthatch							3		9
White-breasted Nuthatch	7	3	5		10	2			425
Brown-headed Nuthatch		2	5	51		3	6	8	87
Brown Creeper									13

Species	CE	KE	TA	DO	CN	WI	WO	SO	Total
House Wren	8	3	6	34	10	13	5	15	617
Winter Wren									3
Marsh Wren				31		2		16	74
Carolina Wren	9	90	60	77	66	48	28	24	1975
Blue-gray Gnatcatcher	6	47	14	48	47	16	58	15	1391
Golden-crowned Kinglet									6
Ruby-crowned Kinglet	1								5
Eastern Bluebird	1	17	63	44	54	5	12	4	1172
Veery	1	1	1		2				58
Gray-cheeked Thrush		1							12
Swainson's Thrush	4	1	1		1				150
Hermit Thrush					3				20
Wood Thrush	30	39	35	15	19	11	15	2	1146
American Robin	29	93	246	144	330	181	15	10	3704
Gray Catbird	39	39	24	38	24	14	7	8	2242
Brown Thrasher	1	7	27	16	19	3	3	1	407
Northern Mockingbird	4	27	73	58	60	11	7	6	1059
European Starling	21	192	173	405	518	180	90	28	5586
Cedar Waxwing	5	47	105	4	49	18	1		1591
House Sparrow	4	84	37	28	131	16	4	18	1680
American Pipit				1					5
House Finch	5	22	24	17	36	8	4	2	999
Purple Finch									22
Pine Siskin									21
American Goldfinch	7	40	49	32	96	20	13	4	2054
Eastern Towhee	22	15	5	21	8	7	3	9	825
Chipping Sparrow	8	79	105	78	136	20	23	10	2046
Field Sparrow	1	6	11	6	26	3		1	494
Vesper Sparrow		1			5				16
Savannah Sparrow		1	11	2					78
Grasshopper Sparrow		4	18	11	23	2	14		269
Seaside Sparrow				61		3	26	50	140
Saltmarsh Sparrow				1			1	3	5
Song Sparrow	3		1	4	7	4		4	968
Lincoln's Sparrow									3
Swamp Sparrow				11					95
White-throated Sparrow	2	1	3	2	5	2			158
White-crowned Sparrow									5
Dark-eyed Junco									3
sparrow sp.								1	1
Yellow-breasted Chat	1	11	1	10	10	4	12	8	162
Bobolink	50				25				889
Eastern Meadowlark	10	1		6	3		6	4	225
Orchard Oriole	4	33	18	52	30	13	11	8	469
Baltimore Oriole	5	8	7	1	11				651
Red-winged Blackbird	34	253	387	631	193	99	90	101	5936
Brown-headed Cowbird	10	57	52	123	106	24	18	9	1396

Species	CE	KE	TA	DO	CN	WI	WO	SO	Total
Rusty Blackbird									35
blackbird sp.									31
Common Grackle	1	153	541	422	474	127	145	18	4144
Boat-tailed Grackle				21			4	5	30
Ovenbird	44	59	17	44	35	18	50	20	1150
Worm-eating Warbler	3	6	4	15	7	12	10	1	139
Louisiana Waterthrush	1	1	2	1	6	4	3		199
Northern Waterthrush		4	1	2	3				70
Golden-winged Warbler									1
Blue-winged Warbler	1		1						25
Black-and-white Warbler	9	15	5	7	4	16	8	1	283
Prothonotary Warbler		3	2	7	33	9	27	2	150
Tennessee Warbler	2								33
Nashville Warbler	1								9
Mourning Warbler									5
Kentucky Warbler		7	1		6		4		68
Common Yellowthroat	16	76	52	150	24	25	32	49	2035
Hooded Warbler	9	2							175
American Redstart	16	10	7	23	3	2	8		654
Cape May Warbler	2	1						1	19
Cerulean Warbler									25
Northern Parula	10	16	16	6	11	1	15	1	761
Magnolia Warbler	7	4	5	2	1				175
Bay-breasted Warbler	1			1					72
Blackburnian Warbler	4	1							21
Yellow Warbler	5	2	3	9	3	2	1	1	363
Chestnut-sided Warbler	7	2							187
Blackpoll Warbler	8	21	9	1	15		5		405
Black-throated Blue Warbler	12	2		1	1		1		233
Palm Warbler					2				8
Pine Warbler	2	4	14	70	37	20	23	12	295
Yellow-rumped Warbler	6	5	1		9				211
Yellow-throated Warbler		1	1	6	5	6	27		129
Prairie Warbler		1	1	11	5	12	19	7	229
Black-throated Green Warbler	12	2	1						160
Canada Warbler	1								93
Wilson's Warbler			2	1					32
Summer Tanager		2	5	41	26	15	25	5	255
Scarlet Tanager	16	40	16	7	15	6	2	1	737
Northern Cardinal	21	154	118	109	181	76	26	14	4194
Rose-breasted Grosbeak	1			1					128
Blue Grosbeak		20	46	51	41	17	13	4	364
Indigo Bunting	10	110	45	43	92	35	66	11	1965
Dickcissel					4				12

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2018 Maryland Fall Count

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The annual Maryland Fall Count is held on the third weekend in September with the choice of Saturday or Sunday at the discretion of the county and/or compiler. In 2018, data from 12 of Maryland's 23 counties were compiled. Six counties counted on 15 September, six on 16 September (Table 1). Receiving results from twelve counties is average participation for Fall Count. For several counties this seasonal count has been a long-held tradition, with this year being the 28th count for Allegany, 25th for Howard, and 23rd for Dorchester.

Table 1: 2018 Maryland Fall Count: participating counties, county codes, survey dates, and compilers.

County	Code	Survey Date	Compiler
Allegany	AL	16 September 2018	Chuck Hager
Washington	WA	15 September 2018	Doris Berger
Carroll	CA	15 September 2018	Don Jewell
Howard	HO	15 September 2018	Mike McClure, Chuck Stirrat
Prince George's	PG	16 September 2018	Dave Mozurkewich
Calvert	CT	16 September 2018	Sue Hamilton, Sherman Suter
Kent	KE	16 September 2018	Walter Ellison
Caroline	CN	15 September 2018	Debby Bennett
Talbot	TA	16 September 2018	Dave Palmer
Dorchester	DO	15 September 2018	Harry Armistead
Somerset	SO	16 September 2018	Paul Bystrak
Wicomico	WI	15 September 2018	Paul Bystrak

David Mozurkewich, Prince George's compiler provided the following description to put the count weekend weather in context: "A week before the count, the long-range weather forecast had a major hurricane heading up the Bay with predictions approaching 10 inches [25.4 cm] of rain for the extended weekend. Every subsequent forecast had the storm making landfall a little earlier and a little further south until it hit the coast of southern North Carolina on Thursday [13 September 2018]. Hurricane Florence stalled then headed inland and was in SW Virginia the day of the count. The storm pushed some interesting

birds into the mouth of the Chesapeake Bay but unfortunately, it was too far away to push them into our area. Fortunately, the storm was far enough away to avoid any storm damage to our area. The days before the count were dreary with unfavorable winds and little migration."

The weather varied over the extent of the state and from Saturday to Sunday, but the difference was not dramatic. Temperatures were in the high 60s °F [~20 °C] in the mornings, rising to highs in the mid 80s °F [~29 °C] by mid-afternoon both days. The winds observed on the Eastern Shore were higher with most experiencing steady winds over 10 mph (16 kmph) from the ENE both Saturday and Sunday. Winds in the western counties were generally less than 5 mph (8 kmph). Cloud coverage was quite consistent across the state with significant cloud coverage early followed by partial clearing as the day proceeded. There were no reports of significant precipitation either day, with the only reported precipitation being drizzle at dawn on Sunday in Allegany and Prince George's and a brief scattered shower in mid-morning in Howard on Saturday. Shorebird habitat was limited as tides were described as very high and ponds and reservoirs were full, with no muddy edges due to the significant rainfall preceding the count.

A total of 192 field observers in 137 parties turned up 198 species and 64,382 individual birds. They spent a total of 428.0 hours and covered 320.9 miles (516.4 km) on foot and spent 38.0 hours stationary. Birders spent 197.4 hours and 2158.4 miles (3473.6 km) birding by car. Participants in six counties reported spending 14.0 hours traveling 73.1 miles (117.6 km) while owling. Feeder watchers spent 28.3 hours (Table 2). A group of nine young birders counted in Dorchester County, marking at least seven years in a row a Youth MOS group has participated.

There were two write-in species reported. A late Orchard Oriole was found in Carroll and a Ring-necked Duck that had been present all summer in Talbot was probably an injured bird.

Other species with only a single individual found statewide included Gadwall (Prince George's), Black Scoter (Talbot), Clapper Rail (Dorchester), Upland Sandpiper (Dorchester), Baird's Sandpiper (Caroline), Buff-breasted Sandpiper (Caroline), Wilson's Phalarope (Dorchester), Lesser Black-backed Gull (Talbot), Least Tern (Caroline), Black Tern (Kent), Yellow-bellied Flycatcher (Talbot), Cliff Swallow (Dorchester), Gray-cheeked Thrush (Howard), Hermit Thrush (Allegany), Grasshopper Sparrow (Prince George's), Lincoln's Sparrow (Howard), and Yellow-throated Warbler (Carroll) (Table 3). The Upland Sandpiper, Least Tern, and Cliff Swallow were the first occurrences in the past 6 years.

Table 2. 2018 Maryland Fall Count: summary.

	AL	WA	CA	HO	PG	CT	KE	CN	TA	DO	SO	WI	Total
Total Species	108	65	105	118	112	87	87	109	103	141	49	46	198
Total Birds	4056	1496	5085	10,315	10,779	2784	1947	5631	5233	16,107	449	500	64,382
Start Time	0720		0628	0545	0530	0620	0630	0430	0600	0520	1400	0645	0430
Stop Time	1830		2000	2000	2230	1820	2000	2030	2000	1815	1900	1915	2230
Parties	11	5	11	44	16	11	2	11	11	8	2	5	137
Individual People	12	7	20	51	20	14	4	16	22	18	2	6	192
Hours Driving	19.0	16.5	25.0	31.0	23.3	4.1	6.0	33.0	12.0	23.0	4.0	0.5	197.4
Miles Driving	209.0	154.0	268.9	316.2	195.5	27.8	28.0	393.0	90.0	456.0	10.0	10.0	2158.4
Hours Walking	30.4	2.5	47.7	152.7	57.5	25.6	8.5	30.3	30.0	36.0	2.0	4.8	428.0
Miles Walking	30.2	3.0	43.5	118.3	44.7	23.4	4.7	13.5	5.5	26.0	3.0	5.1	320.9
Stationary Hours	6.0	3.0	0.3	10.6	1.0	4.3						12.8	38.0
Feeder Hours	2.0	1.0	6.5	6.0	3.0			6.5				3.3	28.3
Hours Owling			0.5	0.5	1.0			2.5	3.5	6.0			14.0
Miles Owling			0.3	0.3	5.0			20.0	10.5	37.0			73.1

The following highlights were noted by compilers and the author. A flight of Common Nighthawks appeared over Carroll (35) and Howard County (27) with the total of 63 birds statewide being over three times higher than the count in any of the previous five counts. The 27 Common Terns seen flying down the Potomac River in Prince George's was a good sighting for the county and similar flocks were reported from Montgomery County the day before and the day after the count. Osprey were reported in 10 counties and the total of 171 was significantly higher than the prior high of 93 seen each of the previous two years, with more lingering than usual as observed by one compiler. Twenty Merlins were a new high with an astounding 14 of those being in Dorchester. The six Olive-sided Flycatchers exceeded the total of 3 birds cumulative seen in the last five counts. The Tree Swallow count of 4692 was also a new high count. The Bobolink total of 1728, mostly found across Dorchester County, was more than twice the prior high during the previous five counts.

Compilers made note of several interesting sightings missed on the count but reported during the days around the count. Three Mississippi Kites were observed in Caroline County on 10 September. On 13 September, a Eurasian Collared-Dove was found in Dorchester but despite searching, it was not found

on count day. On the day following the Dorchester count, a Buff-breasted, a Baird's, and 2 Stilt Sandpipers were found at a location not visited during the count.

There were 39 species that were observed in only one county. Twelve of these were observed in Dorchester County, with the rest being 6 in Caroline and Talbot, 4 in Howard and Prince George's, 3 in Allegany and Carroll, and 1 in Kent. Fifteen species were reported in all 12 counties which is lower than normal largely due to some counties having very limited coverage.

Thank you to all participants and especially the compilers. I urge more participants to enjoy the experience and join in one of the 2019 counts that will be held on 21 or 22 September. I hope additional counties will have volunteers who choose to organize a count in the future and reverse the trend of decreasing interest and participation in organized seasonal counts.

Table 3. 2018 Maryland Fall Count: observed species.

Species	AL	WA	CA	HO	PG	CT	KE	CN	TA	DO	SO	WI	Total
Canada Goose	395	10	731	1526	580	108	105	124	104	527	59	98	4367
Mute Swan					10								10
Wood Duck	9	7	10	40	51	5	11	18	8	82		1	242
Blue-winged Teal										4			4
Northern Shoveler					1				5	25			31
Gadwall					1								1
Mallard	12	4	81	162	196	27	9	43	132	80			746
American Black Duck					8	1	5		2	13			29
Northern Pintail									2				2
Green-winged Teal					1				4	13			18
Ring-necked Duck									1				1
Black Scoter									1				1
Ruddy Duck			1							6			7
Northern Bobwhite								5		8			13
Wild Turkey	13	22	3	2	32		3	35	10	14		4	138
Pied-billed Grebe					1			1					2
Rock Pigeon	97	89	130	144	132	4	7	101	17	25		19	765
Mourning Dove	59	109	163	506	599	66	31	257	200	168	1	20	2179
Yellow-billed Cuckoo	2		8	4	7	6		1	1	3			32
Black-billed Cuckoo				1						1			2
Yellow-billed or Black-billed Cuckoo							1						1
Common Nighthawk			35	27					1				63
Chimney Swift	636	18	66	236	197	4	5	145	68	28			1403
Ruby-throated Hummingbird	61	12	18	34	25	17	7	24	17	37		3	255
Clapper Rail										1			1
Virginia Rail					1				1	6	1		9
Sora					7								7

Species	AL	WA	CA	HO	PG	CT	KE	CN	TA	DO	SO	WI	Total
Black-bellied Plover										4			4
Semipalmated Plover								2		14			16
Killdeer	13			57	40			66		23			199
Upland Sandpiper										1			1
Ruddy Turnstone										2			2
Dunlin										15			15
Baird's Sandpiper								1					1
Least Sandpiper	10							5		62			77
White-rumped Sandpiper	9									5			14
Buff-breasted Sandpiper								1					1
Pectoral Sandpiper								5		6			11
Semipalmated Sandpiper	12							7		140	20		179
unidentified peep										15			15
Short-billed Dowitcher										2			2
American Woodcock								2					2
Wilson's Snipe								7					7
Spotted Sandpiper	2			4				6	1	7	1		21
Solitary Sandpiper	5			1	1				1	1			9
Lesser Yellowlegs										50			50
Greater Yellowlegs				4						22	26		52
unidentified yellowlegs										1			1
unidentified shorebird										2			2
Wilson's Phalarope										1			1
Bonaparte's Gull								2					2
Laughing Gull					947	214	66	34	246	2245	36	47	3835
Ring-billed Gull					29	47	64	240	43	33	48		504
Herring Gull					9	169	7	3	106	373	2	5	674
Lesser Black-backed Gull									1				1
Great Black-backed Gull						311			12	104			427
unidentified gull					10	1		70					81
Least Tern								1					1
Caspian Tern					6	2	47		11	20			86
Black Tern							1						1
Common Tern					27		7	2		11			47
Forster's Tern					21	58	212	14	86	309	4		704
Common or Forster's Tern					4								4
Royal Tern						8	21		42	107	1		179
Double-crested Cormorant	1			12	59	43	90	29	779	368	18	27	1426
Brown Pelican										104			104
Great Blue Heron	4	2	22	36	16	11	21	21	15	61	4	8	221
Great Egret			5	6	17	1	1	1	18	124	29		202
Snowy Egret							4	1	39	76	24		144
unidentified egret							20						20
Little Blue Heron									2				2
Tricolored Heron									1	2	1		4
Cattle Egret									27	16			43
Green Heron	9	1	4	28	11		6	7	7	8			81
Black-crowned Night-Heron							1			2			3
Yellow-crowned Night-Heron			1		1								2

Species	AL	WA	CA	HO	PG	CT	KE	CN	TA	DO	SO	WI	Total
Glossy Ibis								2		4	3		9
Black Vulture	21	13	72	173	97	21	21	98	26	42		1	585
Turkey Vulture	150	60	157	261	95	65	138	262	101	258	8	10	1565
unidentified vulture										40			40
Osprey		1	1	14	15	27	11	16	32	52	2		171
Northern Harrier		2	1	2				1		6	4		16
Sharp-shinned Hawk	5	1	3	3	2				4	1			19
Cooper's Hawk	4		4	5	4			3	2	8			30
unidentified *Accipiter*				2									2
Bald Eagle	5	4	6	19	21	25	37	22	38	84	5	2	268
Red-shouldered Hawk	5	5	9	71	14	2	3	8		7			124
Broad-winged Hawk ----	608	1	3	13			1			1			627
Red-tailed Hawk	10	4	27	18	8	1	4	10	7	4		1	94
Eastern Screech-Owl	7		2	1		2	3	8	10	10			43
Great Horned Owl				3	2			5	6	3		1	20
Barred Owl			3	9	3		2	6	1			1	25
Belted Kingfisher	3	3	8	23	7	6	3	8	5	4	2	2	74
Red-headed Woodpecker	1	1	6	11	2	4				14			39
Red-bellied Woodpecker	38	24	79	178	65	32	29	31	14	11	1	4	506
Downy Woodpecker	21	6	43	107	47	25	20	21	16	28	3	6	343
Hairy Woodpecker	7	1	9	22	10	7	6	4	1	6	1		74
Northern Flicker	53	13	31	48	25	7	2	5	4	7	2	1	198
Pileated Woodpecker	12	8	16	44	12	6	6	15	10	7		3	139
American Kestrel	3	6	5	9	25	1	9	9	12	23		2	104
Merlin				2				1	1	14	1	1	20
Peregrine Falcon				1						2			3
Great Crested Flycatcher	2	1	6	7	4			3	3	4	1		31
Eastern Kingbird			1	9	1	9		2		2	1		25
Olive-sided Flycatcher	2			3	1								6
Eastern Wood-Peewee	34	3	66	92	26	27	18	18	11	19			314
Yellow-bellied Flycatcher									1				1
Acadian Flycatcher	1		5	6	11	17	2			1			43
Willow Flycatcher	2												2
Traill's Flycatcher				1			1		1				3
Least Flycatcher	1			1						2			4
unidentified *Empidonax*	1	1	6	7	6	1				2			24
Eastern Phoebe	49	6	25	26	12	9	2	8		4			141
White-eyed Vireo	2		15	24	14	10	2	6	1	17	1	3	95
Yellow-throated Vireo	3	2	2	5	2	1	1		1				17
Blue-headed Vireo	2		1	2									5
Warbling Vireo			2										2
Red-eyed Vireo	33	8	35	96	52	35	39	9	6	10			323
Blue Jay	112	83	214	512	171	75	36	60	80	81		14	1438
American Crow	77	54	121	303	104	48	12	181	153	148	4	12	1217
Fish Crow		28	259	45	45	3	7	32	5	119	2		545
unidentified crow				193	32	9			32	46		3	315
Common Raven	28	2	1	7	3								41
Horned Lark			1	32				28	2	5			68
Purple Martin									12	18			30

Species	AL	WA	CA	HO	PG	CT	KE	CN	TA	DO	SO	WI	Total
Tree Swallow			1		2		14	1149	596	2930			4692
Bank Swallow								1	2	2			5
Cliff Swallow										1			1
Barn Swallow			2			2	1	7	19	157	1		189
unidentified swallow										40			40
Carolina Chickadee		11	57	114	61	59	22	64	54	80	16	21	559
Black-capped Chickadee	40												40
Tufted Titmouse	57	4	38	109	59	57	21	55	36	38		11	485
Red-breasted Nuthatch	12		10	7	4		7	2	18	2			62
White-breasted Nuthatch	40	9	41	106	35	25	13	11	15	1		2	298
Brown-headed Nuthatch						10			12	46	8		76
House Wren	9		8	17	3	1	7	3	2	7	5	1	63
Winter Wren	2			1									3
Marsh Wren										4			4
Carolina Wren	59	33	108	354	158	84	69	60	64	84	7	28	1108
Blue-gray Gnatcatcher	3	11	5	16	11	4	5	3	16	32	1		107
Ruby-crowned Kinglet			3	1									4
Eastern Bluebird	40	64	98	150	68	36	12	103	61	62	2	1	697
Veery			3	4	1	5	2			4			19
Gray-cheeked Thrush				1									1
Swainson's Thrush	2		14	9					1	1			27
Hermit Thrush	1												1
Wood Thrush	4		43	14	7	7	3	1		2			81
American Robin	29	15	100	204	99	15	1	119	30	29		8	649
Gray Catbird	52	7	244	313	83	23	20	6	17	12		8	785
Brown Thrasher	6	1	15	19	6	6	11	6	12	3			85
Northern Mockingbird	11	5	48	81	38	16	24	45	23	40	1		332
European Starling	198	406	794	1557	2370	59	263	966	702	1912	54		9281
Cedar Waxwing	123	101	114	65	48			8		11	8		478
House Sparrow	79	20	62	308	92	46	3	124	13	59			806
House Finch	25	9	50	103	40	21		44	16	3		17	328
Purple Finch	3	1											4
American Goldfinch	100	34	123	286	72	117	8	101	66	44		11	962
Eastern Towhee	14		31	39	8	2	5	4		1			104
Chipping Sparrow	135	37	97	122	448	49	25	114	66	63	2	1	1159
Field Sparrow	13	8	2	4	4			5				1	37
Savannah Sparrow	1	2	1	20		3				2			29
Grasshopper Sparrow					1								1
Seaside Sparrow										8	2		10
Song Sparrow	18	8	41	42	8	3		1	1				122
Lincoln's Sparrow				1									1
White-throated Sparrow		1	1										2
unidentified sparrow				2		4		2					8
Yellow-breasted Chat				2									2
Bobolink	1			32	108			76	8	1497		6	1728
Eastern Meadowlark								5		1			6
Orchard Oriole			1										1
Baltimore Oriole				7									7
unidentified oriole					2					1			3

Species	AL	WA	CA	HO	PG	CT	KE	CN	TA	DO	SO	WI	Total
Red-winged Blackbird			111	37	1097		6	48	186	680	5	40	2210
Brown-headed Cowbird		40	2	65	1011	9		59	410	207			1803
Common Grackle	10		8	3	548	305		6	10	1241			2131
Boat-tailed Grackle										2	2		4
unidentified blackbird								100					100
Ovenbird	3		5	18	1	1	1	1		1			31
Worm-eating Warbler	3	1		2						1			7
Northern Waterthrush			1			3		2					6
Blue-winged Warbler	1			3	1								5
Black-&-white Warbler	2	1	13	44	23	14	18	13	10	15			153
Tennessee Warbler	7			2	1	1							11
Nashville Warbler	3			1									4
Mourning Warbler	1				2								3
Kentucky Warbler	1			1									2
Common Yellowthroat	21		35	119	20	40	17	6	7	26		2	293
Hooded Warbler	8				2	3							13
American Redstart	21	1	20	51	27	23	27	29	22	16			237
Cape May Warbler	11							1		4			16
Northern Parula	4		6	8	13	8	13	3	8	3			66
Magnolia Warbler	18		9	16	4	4	8		3				62
Bay-breasted Warbler	1						1						2
Blackburnian Warbler	10			3	2			1	1				17
Yellow Warbler	1		1							2			4
Chestnut-sided Warbler	17		4	19	3	1	1	2		1			48
Blackpoll Warbler	13				1		1		1				16
Black-throated Blue Warbler	11		5	12	2	2	2	3		1			38
Palm Warbler	4		2	1				1					8
Pine Warbler	7	6	2	2	8	8	1	6	33	62	3	2	140
Yellow-rumped Warbler	1		4					2					7
Yellow-throated Warbler			1										1
Prairie Warbler	3			4			1			3			11
Black-throated Green Warbler	26	1	4	7	2	1							41
Canada Warbler	2		1	6									9
Wilson's Warbler			1	1									2
unidentified warbler	3	2		46				1		1			53
Summer Tanager					1	4				11		2	18
Scarlet Tanager	20		7	12	9	3	3	1		2			57
Northern Cardinal	82	42	145	441	157	106	136	63	68	85	13	32	1370
Rose-breasted Grosbeak	7		6	9	6								28
Blue Grosbeak			2	8	12	9	4	35	13	58	3	3	147
Indigo Bunting	6		12	24	5	7	4		2	15		4	79
Total Birds													**64,382**

MARYLAND BIRDLIFE

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